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ERRATA.

- Page 180, lines 14 and 26 *for* "Ternaeoidea" *read* "Lernaeoidea."
 ,, line 27, *for* "Ayulus," *read* "Argulus."
 ,, line 28, *for* "Tevella," *read* "Penella."

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The Irish Naturalist.

VOLUME XXII.

THE SHELLY DRIFT OF GLENULRA AND BELDERRIG, CO. MAYO.

BY J. DE W. HINCH.

The earliest information regarding the Shelly Drift of north Mayo occurs in a paper read before the Geological Section of the British Association in 1875, by W. A. Traill.¹ The paper gives a short description of the deposits in Glenulra, and at Fiddawtawnanauneen, and mentions the occurrence of shells and shell fragments, those identified being *Tellina proxima*, *Cyprina islandica*, and a *Balanus*. The author disclaims any desire to theorize on the origin of the deposits, and only wishes to place on record the facts which had come under his notice. A considerable addition to our knowledge of the deposits was made during the mapping of the solid geology of the district by H.M. Geological Survey.² Mr. W. A. Traill reported the occurrence of a hard blue compact clay (*till*) with shells as the lowest component of the series. This till occurred in Glenulra, Fiddawtawnanauneen, and at Belderrig Harbour, and at the last two places *Tellina calcarea* was found in considerable abundance, and with the valves unbroken.

Above the till was widely-spread brownish Boulder-clay, in which at Glenulra and the Owenbehey were found numerous shell-fragments. A collection of these was

¹ On the occurrence of a Lower Boulder-clay or Till, with shells, in the Counties of Down and Mayo, Ireland. British Association Report, 1875, pp. 83-84.

² Memoir to accompanying sheets 39, 40, 51, 52, Geol. Surv., Ireland. Dublin, 1881.

made, and with those collected at Belderrig, submitted to Canon Grainger, M.R.I.A., who named the following :—

Tellina calcarea	Cyprina islandica
Saxicava rugosa	Leda pernula
Leda abyssicola ?	Buccinum undatum
Mya truncata	Mytilus modiolus
Fusus antiquus	Balanus
Natica (borings)	

Overlying the Boulder-clay occurred sands and gravels, which at Glenulra and Glenglassera attained a considerable development, and at these places contained shell-fragments.

The natural history survey of Clare Island during the past few years raised many questions of geological interest, and one of the most important was the evidence for any considerable change of climate during the Glacial Epoch. The occurrence in the Boulder-clay of the shells of marine mollusca, the distribution of which is to-day either arctic or northerly, is considered as tending to prove that at that time the climate was much more severe than at the present day. Among the species of mollusca obtained from the Boulder clay of Clare Island not one occurred which is not still common and widely distributed around the British and Irish coasts. A further search of Clew Bay yielded no faunistic results, and it was then decided that an examination of the north Mayo deposits should be undertaken, as in Canon Grainger's list at least two of the mollusca—*Tellina calcarea* and *Leda pernula*—were of those northerly types, which are not present in the British seas of to-day, and it was hoped that a further search might add to the number. The conditions under which the unbroken valves of *Tellina calcarea* occurred was also considered as a matter to be looked into, as such large, flat, fragile shells are very seldom found unbroken in true Boulder-clay.

With these objects in view two visits were paid to north Mayo during the past year—one in August, when days of unceasing rain were a great advantage for the collection of shell-fragments—the second in October, when a drought of three weeks had emptied the streams in many cases to dryness, enabling one to move about freely and inspect the sections. The coast from Lackan Bay to Portacloy, a

distance of twenty-two miles as the crow flies, was examined during a total of thirteen days, and the limits of the shelly drift ascertained. From Lackan Bay around Downpatrick Head to Ballycastle is pleasant open country, but from Ballycastle westward the land gets steadily wilder and bleaker, until between Belderrig and Porturlin it becomes desolate in the extreme. It was found that the limits of the Shelly Drift were roughly the eastern slope of Glenulra, and the western slope of the Belderrig River valley; and on the ground between these two points most of the time was spent, with the result that as regards the mollusca a number of new records may be added to Canon Grainger's list—and that the Boulder-clay near Belderrig, containing *Tellina calcarea*, is found to be of later date than the till in Glenulra and of the overlying brown Boulder-clay. The following appears to be the sequence of the Glacial deposits in this district :—

5. Sands and gravels.
4. Belderrig Boulder-clay with *Tellina calcarea*.
3. Brown Boulder-clay, mostly of local origin.
2. Stiff blue Boulder-clay (Till).
1. Boulder-bed in the Owenbehy.

1. The Boulder-bed in the Owenbehy is composed of rounded and sub-angular boulders of sandstone, with practically no clay and with no shells. It has a thickness of about two feet, and occurs in the left bank of the river, which it occupies for about 100 yards. As this bed does not appear in any other section in the district it may be the old river debris of pre-glacial times.

2. The Till or stiff blue clay with erratics and shell-fragments occurs in three places in the district—Glenulra, at an elevation of about 160 feet, and the eastern and western branches of the Owenbehy, at about 270 feet. In each case it makes its appearance in the same manner, first becoming visible in the bed of the stream between the river boulders; then it gradually begins to appear from under the local Boulder-clay in the river-bank, and having attained a thickness in most cases of about 4 feet it disappears again under the local Boulder-clay, after running for about 100 yards. The erratics noted in the till were striated limestone, sandstone, mica-schist, grits and granite.

Six sections of this till were examined, three in Glenulra and three in the Owenbehy, and a large collection of shell-fragments was made; the following species were determined from the collection made up in Glenulra:—

<i>Ostrea edulis</i> , Linn.	<i>Tellina balthica</i> , Linn.
<i>Mytilus</i> , sp.	<i>Corbula</i> sp.
<i>Nuculana</i> (<i>Leda</i>) <i>pernula</i> O. F. Müller.	<i>Glycimeris</i> (<i>Panopea</i>) <i>norvegica</i> , Speng.
<i>Cardium edule</i> , Linn.	<i>Mya truncata</i> , Linn.
<i>Cardium echinatum</i> , Linn.	<i>Turritella communis</i> , Risso.
<i>Cyprina islandica</i> , Linn.	<i>Purpura lapillus</i> , Linn.
<i>Astarte borealis</i> , Chem.	<i>Balanus poratus</i> .

From the collection of shell-fragments made in the Owenbehy, *Corbula* and *Purpura* were absent; otherwise the list was the same as for Glenulra.

3. The third in the sequence is the brownish Boulder-clay, which extends widely over the area examined. In composition it varies from tough Boulder-clay, with rounded and striated erratics, to mounds of loose rocky debris, and in development it ranges from a few inches in exposed places to sections of forty or fifty feet in thickness in favourable localities. The erratics in this Boulder-clay include sandstones, grits, limestones, granite, and mica-schists, but the dominant boulders are sandstone, some fairly rounded, but the greater number merely blocks and slabs derived from no great distance. In Glenulra and the Owenbehy this Boulder-clay rests on the eroded surface of the Till, and in these places shell-fragments may be found in it in considerable abundance. This Boulder-clay was searched for shells from Lackan to Glenulra, from Glenglassera to Porturlin, and also along the Glen valley for eight miles in the direction of Crossmolina without a solitary shell-fragment being found, so it may fairly be assumed that the shells found in it in Glenulra and the Owenbehy were derived from the underlying till during the process of denudation. The following is a list of the species identified from this Boulder-clay:—

<i>Mytilus</i> , sp.	<i>Tellina balthica</i>
<i>Nuculana</i> (<i>Leda</i>) <i>pernula</i>	<i>Turritella communis</i>
<i>Cyprina islandica</i>	<i>Balanus</i> , sp.

4. The *Tellina* Boulder-clay of the Belderrig district occurs at the mouth of the Belderrig river, about 50 feet above sea-level, and at Fiddawntawnanauneen at an elevation of about 120 feet. The clay, which is highly calcareous, contains many erratics, striated pebbles of limestone, granite, mica-schists, sandstones, and quartz rock. Numerous shell-fragments also occur at Belderrig. The really striking feature of this clay is the presence of large numbers of complete valves of *Tellina calcarea*. This bivalve, which is synonymous with *T. proxima* and *T. lata*, and is restricted at the present day to the colder regions of the Northern Hemisphere, has an average length and height of $1\frac{3}{4}$ and $1\frac{1}{2}$ inches, and like all the *Tellinas* has no special strength of shell, yet after heavy rain a dozen unbroken valves may be easily collected. Many of the valves have such sharp outline, and retain their epidermis, colour, and glaze to such an extent as to be indistinguishable from modern specimens. The extraordinarily perfect state of preservation of these Belderrig *Tellinas* when compared with the fragmentary condition of the shells obtained from the till of Glenulra and the Owenbehy raised the question as to a possible later origin of the Belderrig Boulder-clay; and the occurrence in the Clyde valley of *Tellina proxima* (= *calcareo*) as the chief shell in clays usually classed as late Glacial supported this view. The latter date of the Belderrig Boulder-clay was practically settled by finding in one of the streams near Fiddawntawnanauneen, that the *Tellina* clay rested on a clay which differed in no respect from the brownish Boulder-clay of the district. The following shells were found at Belderrig, usually in a fragmentary condition.

<i>Ostrea edulis</i>	<i>Cyprina islandica</i> .
<i>Mytilus</i> , sp.	<i>Tellina balthica</i>
<i>Nuculana</i> (Leda) <i>pernula</i>	<i>Glycimeris</i> (Panopea) <i>norvegica</i>
<i>Cardium edule</i>	<i>Turritella communis</i> .

5. The Sands and Gravels of the district do not present any special points of interest, as they are the usual extremely variable fluvio-glacial deposits, so characteristic of the closing stages of the Ice Age. In Glenulra shell-fragments are very abundant, but did not add any new species to the list obtained from the Till.

It had been hoped that the source of origin of the three Boulder-clays which were examined would be shown by a careful review of the evidence obtained from the Mollusca and the erratics. That the brownish Boulder-clay came from the southward may be assumed at once, all the available evidence supporting that view. The points of origin of the Glenulra Till and the Belderrig Tellina-clay is much more obscure. It is clear that both came from the northward, the abundance of shells and shell-fragments proving this beyond question, but we are unable to make any definite statement beyond that. A considerable collection of erratics was made from each horizon visited, and efforts were made to find some typical rocks which could be traced to Donegal. This ended in failure, because sandstones, grits, limestones, mica-schists occur also in the Sligo district, and such granites as were found may also have come from the direction of the Ox Mountains. Mr. Kilroe, of H.M. Geological Survey, who very kindly looked over the collection, could find nothing typical of Donegal, and considered that the facies of the collection pointed to the Sligo and east Mayo direction. The matter must remain in this state for the present, but the possibility that the Belderrig Tellina-clay was brought by floating ice must not be overlooked. This deposit is so limited in extent, and occurs so near the present coast-line that even one large berg could have swept the Tellina-clay into its present position.

I have to thank Mr. R. J. Ussher, of Cappagh, for much friendly advice regarding this rather out-of-the-way district.

National Library of Ireland.

IRISH OLIGOCHAETS.

BY REV. HILDERIC FRIEND, F.R.M.S.

In a recent issue of this Journal¹ I gave some account of the annelids found in earth attached to *Primula* roots from Poyntzpass. After my examination in May, I placed the material (earth and decaying roots) in a tin box, and set it aside till the end of September. Meanwhile I had been studying the seasonal order of appearance², and, as my second examination of the Poyntzpass earth throws further light on the subject, I think it desirable to give an account of what I have found. My first report showed no fewer than eight species of annelids to be present in the small quantity of earth received. I removed all the specimens I could find, leaving the earth, as far as could be ascertained, free from oligochaets of every description. It was, therefore, with no little surprise that I found, after the lapse of four or five months, no fewer than nine species of annelids present. These, moreover, were not all of the same species as previously reported, but consisted of a number of new species, one of which seems to be new to science. I give them in the order in which I found them and at the end will be found a complete list of the species. The earth has again been set aside to see if any further results may be obtained.

1. *Dendrobaena subrubicunda*, Eisen.

One adult and two young specimens found, in addition to those reported in September. A cocoon also seen on September 24th, but next day the cocoon seemed to have yielded a young worm, which was returned to the box with the two young ones, to await development. The cocoons of this species are green, and about the size of a mustard seed or smaller.

2. *Fridericia bisetosa*, Levinsen.

Three further specimens of this species were present. Length about 10 mm., segments about 50. White to the naked eye, but brownish under the microscope. Setae 1-2 with blunt external points; bent within. Spermathecae with fairly long ducts and two diverticula. Salivary glands slightly branched; brain straight or slightly convex before and behind. appearance varying with tension.

¹ vol. xxi., 1912, p. 171-174.

² *Zoologist*, July, 1912, p. 246-249.

* 3. *Fridericia helvetica*, Bretscher.

Length 10-12 mm. Segments 42; similar to the foregoing in size and colour, but with obtuse or bluntly rounded head; setae 4 per set in front, 2 innermost shorter than outer pair; 2 per bundle behind. Adult; girdle with cells arranged in pretty regular rows, some 35 in number. Very long, irregularly curved duct with large pores and atrial glands, with funnel about 3×1 . The duct ciliated. Girdle extending from xii. to $\frac{1}{2}$ xiii., as is most usual, dorsal setae present on xii. Coelomic corpuscles large; mixed with brown circular cells, which may have been chloragogen cells detached from the intestine. Nerve chord enlarged in front; brain not observed. Large nephridia in 6/7-10/11, with somewhat long duct springing from the middle of the post-septal. Two diverticular to the spermathecae.

This description is in almost exact agreement with that of the species found by me at Acresford, near Ashby-de-la-Zouch, July 2nd, 1911 (2).

4. *Enchytraeus minimus*, Bretscher.

No fewer than ten additional specimens of this liliputian enchytraeid found on the occasion of my second examination. It is frequently not more than 2 mm. in length, and even the largest specimens do not exceed 4 or 5 mm. Though opaque white to the naked eye, the worm appears very dark under the microscope. For details and references the former report may be consulted.

* 5. *Enchytraeus Bucholzii*, Vejdovsky.

Long known in England, this worm was first reported for Ireland by Southern in 1906 (*Irish Nat.*, vol. xv., p. 184). As this species, as well as the two which follow, has been the occasion of a good deal of confusion, I append a few notes relating to the Poyntzpass specimens.

Length 10-12 mm. Segments 36. Setae 2-3. Salivary glands rather large, with free ends somewhat expanded. Girdle somewhat conspicuous, small duct to funnel which is about 2×1 . Spermatheca short, stout, bottle-shaped, with glands at $4/5$ opening. Intestine dark, owing to the dark, oily chloragen cells resembling those of *E. minimus*. Coelomic corpuscles many, large, grey. Brain large, varying behind with tension. Dorsal vessel arising in the 13th segment, and running forward like a white stream amid dark alluvium. Three pairs of septal glands. Nephridia in the front segments with large postseptal and duct from the middle; those behind the girdle were elongated. Testes filled segments 10-11. Cells of girdle rather large and irregular, about equal in size to the clear spaces. Funnels and spermathecae full of spermatozoa.

† 6. *Enchytraeus pellucidus*, Friend.

Quite distinct from the foregoing and the next. Four specimens present, fully adult. The very long brown duct, extending back to Segment 16, 17, or 18 is a remarkable feature.

* New to Poyntzpass List.

† New to Irish List.

*** 7. *Enehytraeus albidus*, Henle.**

Three fine, adult specimens. Length averaging 12 mm., with 40 segments. This and the foregoing, when found in rich soil or manure will often reach the length of 1 inch (or 25 mm.), but size is only of relative value. Setae varying in different parts of the body as follows;—

Front.—Four dorsal and 5 ventral.

Middle.—Two dorsal and 3 ventral.

Posterior.—Usually 3 dorsal and ventral; but occasionally 2 or 4. Thus it frequently happens that the sets in the mid region contain the smallest number, whereas in many species the posterior end has the fewest.

Sperm-funnel 5-6 × 1, narrow and long with clearly marked neck. Duct large and stout, confined to segments 12-13, or 14. Very large pores on xii., but no well-marked atrial gland within.

8. *Fridericia Michaelseni*, Bretscher.

Already reported for Poyntzpass. Setae 6 per set in front. Salivaries long and branched. Spermathecae with 2 diverticula and fairly long slender ducts. No glands at 4/5 opening. Rather stout and somewhat long ducts to the sperm-funnels in xii.

† 9. *Henlea glandulosa*, sp. n.

Length 10-12 mm., segments 35. Setae 4-6 per bundle, those in the anterior part of the body similar to *Fridericia*, *i.e.*, shortest in the middle. Three pairs of septals in the typical positions 4/5, 5/6, 6/7; the hindmost pair large. Girdle cells small. Very large glands at xii., with large pores; funnel 2 × 1, with large duct, irregularly coiled. Coelomic corpuscles large and discoid. No oesophageal glands, intestine enlarged in 7, dorsal vessel arising in front of septum 7/8. Head small, as well as brain, which (as usual in *Henlea*) is about $1\frac{1}{2} \times 1$, and slightly indented behind. Gizzard large. Dorsal vessel irregularly branched in segment 4, and pulsing in 7, 6, 5. Spermathecae with glands, but no distinct ampulla. The anteseptal of the nephridia small, and the post-septal large. No salivaries seen. See figures on next page.

In a Monograph of the Genus *Henlea*, now in the hands of the Sec., R.M.S., I have described something like a score of British species, but, so far as I can gather, not one of them agrees with this description, though

* New to Poyntzpass List.

† New to Science.

it closely resembles *H. marina*, Friend, in many particulars. It will be seen to differ from *H. hibernica*, Southern, and *H. nasuta*, Eisen, in the matter of oesophageal glands. The following Table will afford some

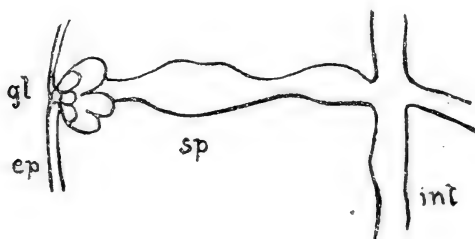


Fig. 1.

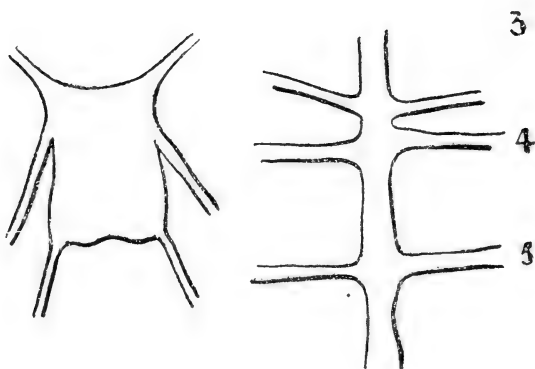


Fig. 2.

Fig. 3.

FIG. 1.—Spermatheca (sp.) of *Henlea glandulosa*. Ep. epidermis. G. Glands at 4/5 opening. Int. Intestine into which spermathecae open.

FIG. 2.—Brain of *Henlea glandulosa* with attachments.

FIG. 3.—Dorsal blood vessels of *Henlea glandulosa*, showing double branching in segment 4, not symmetrical.

idea of the position of our new species in relation to others already known to occur in Great Britain :—

1	{	Two pairs of spermathecae	<i>H. puteana.</i>
		One pair of spermathecae	2.
2	{	Oesophageal glands present	<i>H. hibernica.</i>
		Oesophageal glands absent	3.
3	{	Setae not exceeding five per bundle ..	4.
		Setae exceeding five per bundle ..	5.
4	{	Three pairs septal glands	5.
		Four pairs septal glands	<i>H. tenella.</i>
5	{	Spermathecae without 4/5 glands ..	<i>H. curiosa.</i>
		Spermathecae with 4/5 glands ..	<i>H. glandulosa.</i>

We thus have the remarkable number of thirteen species of Oligochaets, some represented by a dozen or more specimens, in two or three ounces of earth. The complete list is as follows :—

ENCHYTRAEIDAE.

- | | |
|--|---|
| 1. <i>Henlea glandulosa</i> , Friend. | 6. <i>Fridericia bisetosa</i> , Levinsen. |
| 2. <i>Enchytraeus albidus</i> , Henle. | 7. <i>Michaelseni</i> , Bretscher. |
| 3. <i>pellucidus</i> , Friend. | 8. <i>helvetica</i> , Bretscher. |
| 4. <i>minimus</i> , Bretscher. | 9. <i>Achaeta spermatophora</i> , Friend |
| 5. <i>Bucholzii</i> , Vejdovsky. | |

LUMBRICIDAE.

- | | |
|---|--|
| 10. <i>Dendrobaena subrubicunda</i> , Eisen. | 12. <i>Allolobophora caliginosa</i> , Savigny. |
| 11. <i>Aporrectodea chlorotica</i> , Savigny. | 13. <i>Lumbricus rubellus</i> , Hoffmeister. |

I have to acknowledge the aid of a Government Grant through the courtesy of the Royal Society, for these researches.

BIBLIOGRAPHY.

- 1.—Friend. *Irish Naturalist*, September, 1912, pp. 171–174.
- 2.—Friend. "British Enchytraeids," *J.R.M.S.*, 1912. Several papers, still in process of publication.
- 3.—Friend. *The Naturalist*, March, 1912.
- 4.—Southern. *Irish Naturalist*, 1907, vol. 16.
- 5.—Southern. *Proc. Roy. Ir. Acad.*, 1909, vol. xxvii., Section B, pp. 119, *et seq.*
6. Michaelsen. *Das Tierreich*, Oligochaeta, 1900. Swadlincote, Burton-on-Trent,

SOME NEW LOCALITIES FOR MARINE ALGAE.

BY J. ADAMS, M.A.

Some time ago I submitted a parcel of Algae collected during several years from various parts of Ireland, to Mr. A. D. Cotton, of Kew, who kindly named the rarer species for me. Among these there appear to be three not previously recorded from Ireland, namely, *Enteromorpha crinita*, J. Ag.; *Ascocyclus sphaerophorus*, Sauv.; and *Callithamnion scopulorum*, Ag.¹ Particulars concerning the distribution of some commoner species are also given, as some of these though common on several parts of the coast are entirely absent from several counties.

CHLOROPHYCEAE.

Cladophora sericea, Kütz.—Malahide, 18th June, 1909.

Enteromorpha crinita, J. Ag.—Killiney, 6th July, 1909.

PHAEOPHYCEAE.

Alaria esculenta, Grev.—Killough, 12th August, 1905.

Ascocyclus sphaerophorus, Sauv.—Killough, 12th August, 1905.

Castagnea Zosteræ, Thur.—Ireland's Eye, 13th July, 1904.

Chordaria flagelliformis, Ag.—Donaghadee, August, 1910.

Cystoseira granulata, Ag.—Larne Lough, 23rd September, 1904.

Ectocarpus siliculosus, Kütz.—Killough, 12th August, 1905.

Litosiphon Laminariae, Harv.—Killough, 12th August, 1905.

Punctaria latifolia, Grev.—Near Howth, 30th May, 1904.

RHODOPHYCEAE.

Callithamnion scopulorum, Ag.—Howth Head, 11th June, 1904.

Calloclax neglectus, Schm.—Brown's Bay, Island Magee, 17th Sept., 1904.

Ceramium rubrum, Ag.—Killough, 12th August, 1905.

Colacolepis incrustans, Schm.—Larne Lough, 23rd September, 1904.

Delesseria rubens (Huds).—Donaghadee, August, 1910.

Gelidium latifolium, Born.—Donaghadee, August, 1910.

Heterosiphonia plumosa, Batt.—Larne Lough, 23rd September, 1904.

Nitophyllum punctatum, Grev.—Donaghadee, August, 1910.

N. ramosum, Batt.—Donaghadee, August, 1910.

Odonthalia dentata, Lyngb.—Floated up at Killough, 12th August, 1905.

Phyllophora epiphylla, Batt.—Larne Lough, 23rd September, 1904.

¹ Since this paper was written Mr. A. D. Cotton's paper on the Marine Algae of Clare Island (*Proc. R.I.A.* vol. xxxi.) has appeared, mentioning this species.

In the *Ulster Journal of Archaeology*, vol. i., 1853, there is a paper by Geo. C. Hyndman, entitled "Notes on the Natural History of Tory Island." At p. 37 there is a short list of Algae, and as this is not included in any of the Bibliographies of Irish Algae it seems worth referring to. It contains ten species. Quoting the old names as they stand these are as follows:—*Fucus vesiculosus*, *F. nodosus*, *Himanthalia lorea*, *Laminaria digitata*, *Rhodomenia laciniata*, *Plocamium coccineum*, *Ptilota plumosa*, *Conferva rupestris*, *Codium tomentosum*, *C. adhaerens?* (according to Dr. Harvey).

Royal College of Science, Dublin.

REVIEW.

MANX COLEOPTERA.

The Aquatic Coleoptera of the Isle of Man, with some remarks on the origin of the Fauna. By F. BALFOUR BROWNE, M.A. *The Naturalist*, March, 1911.

Bearing in mind the many points of similarity between the Manx and the Irish faunas, this carefully-prepared paper should be of great use to those interested in the distribution of Irish insects. According to the author, the Isle of Man is a sufficiently productive collecting-ground for water-beetles, there being plenty of streams and small ponds. The only groups in which the island is deficient are those characteristic of lakes and marshes. In all 92 specimens were found, chiefly the result of the author's researches, combined with notes made from the valuable local collection formed by the late Dr. Bailey.

The paper contains some useful comparisons on the range in Great Britain of many of our rarer species. Amongst these, perhaps, the most interesting, from an Irish point of view, is *Bidessus minutissimus*, an extremely local species, found for the first time in the Isle of Man by Mr. Balfour Browne. Notes on the distribution of this species will be found in the *Irish Naturalist* for January, 1912.

The Irish localities for *Gyrinus urinator* are given as South Kerry, West Cork, and Toome Bridge in county Antrim, where a single specimen was taken by Mr. Welch. Of interest also in the local *Octhebius Lejolisii*, a species which has now been traced on the sea-coasts of several of our northern counties, and will probably be found all round the Irish littoral.

From a careful analysis of their respective faunas the author remarks "there is a slight indication that the Manx water-beetles are more like those of North-West England than those of either South-West Scotland or North-East Ireland" (p. 158).

J. N. H.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent arrivals include a large male Chimpanzee, deposited by the Hon. Walter Rothschild ; a Hoolock Gibbon, given by Dr. F. M. Falkner ; a Macaque Monkey, deposited ; a pair of Black Spider Monkeys, purchased ; a Grey Ichneumon, given by Mr. M. Jones ; a Kinkajou, purchased ; a Badger, given by Mr. A. Gorges ; two Guinea-pigs, given by Mr. Wesley Field ; a pair of Alpine Marmots, purchased ; Rabbits, given by Messrs. A. Molloy and Geo. Bingham, and Mrs. Kinsella ; Golden-headed Troupials, Brazilian Hangnests, and Bearded Tits, purchased ; a Roseate Cockatoo, given by Mrs. Kinsella ; a Barn Owl, given by Rev. C. Halahan ; a Grey Parrot deposited ; and a Burmese Hawk Eagle, given by Dr. F. M. Falkner.

Mr. Rothschild's Chimpanzee, "Tom" by name, is the largest ape ever shown in the Zoological Gardens, measuring between 4 and 5 feet in height. He is in excellent health, very active, and friendly. The new fish-hatchery is now in working order. At present there are 8,000 salmon eggs in the boxes, and a large consignment of trout eggs is expected shortly. Mr. W. S. Green, C.B., Inspector of Fisheries, lectured to a large audience in the Royal Dublin Society's Theatre on December 12th, taking "Irish Fisheries" as an appropriate subject.

BELFAST NATURALISTS' FIELD CLUB.

OCTOBER 31.—CONVERSAZIONE IN THE ASSEMBLY BUILDINGS.—Over 300 members and visitors were present in the large hall. A large number of exhibits were on view during the evening, including the following:—Models illustrating insects injurious to agricultural and forest crops, lent by the Belfast Municipal Museum. F. BALFOUR BROWNE: drawings illustrating points of interest in the life-history of water-beetles. F. C. FORTH: entomological and botanical specimens. William GRAY: cornea of an insect's eye, its multiple images. Nevin H. FOSTER: living Woodlice, and a short account of these animals printed, of which copies were distributed. Joseph MAXWELL and William DUNCAN: living examples of *Stephanoceros Eichornii* found in a brick-pond at Oldpark. R. WELCH: living Irish land and freshwater snails. A. W. STELFOX: living examples of Irish slugs, including *Limax cinereo-niger* from Drumbo Glen, a new record for Co. Down; also living snails from Algeciras, and living millipedes from Burmah. R. H. WHITEHOUSE: pond-dwellers in aquaria, and some specimens of *Salamandra maculosa* and *Lacerta viridis*, lent by Professor Gregg Wilson. J. HAMILTON: Caterpillars of *Bombyx cecropia*. N. CARROTHERS: *Lathyrus palustris* from Ellis's Cut, Co. Down, and other plants. S. A. BENNETT: plants collected by pupils of Campbell College in the grounds. Rev. C. H. WADDELL: plants which are rare in Co. Down, *Orchis pyramidalis* found at Greyabbey being noteworthy. H. L. ORR: cases illustrating the fruiting of various local trees. W. H. PHILLIPS: a fine collection of British Ferns, printed from life. W. J. C. TOMLINSON: plants collected in the vicinity of Weymouth. A. W.

STELFOX : living plants of *Saxifraga oppositifolia*, *Silene acaulis*, *Arenaria verna*, *Dryas octopetala*, and *Orobanche rubra*, collected recently at Benevenagh, Co. Derry, accompanied by maps giving their Britannic distribution, by photographs showing their habitats, and by photos illustrative of the habitats of alpine plants in Ireland and Norway. ROBERT BELL : crystalline gypsum, new to the district, from Ballymurphy brickworks. A. M'I. CLELLAND : photographs and specimens from the Auvergne district, France. DR. A. R. DWERRYHOUSE : relief maps of Belfast district, illustrating contour of the ground and the relation of the surface drainage to the slope of the country ; also rocks from the Isle of Arran, some of which have already been recognised in the glacial drift of the North of Ireland, and were collected with the object of determining whether or no other Arran rocks have contributed to our drift deposits. W. J. FENNELL : specimens of smoky quartz crystals, of Mourne granite, chalcedony, Iceland spar, gypsum, glauconite, &c. In the miscellaneous section were some rush crosses and harvest bows from Co. Antrim, exhibited by Miss Elizabeth ANDREWS. T. W. DUNLOP : collection of ancient stone instruments from the Tertiary gravels of N.W. Texas, and similar specimens from Irish gravel pits. ROBERT MAY : old Irish rushlight and candle holders ; toasters of various types were shown, also a bone of a Red Deer found during excavations at the new premises for Messrs. Coates & Co., Belfast. CANON LETT : a stone from Dromore, known as " St. Colman's Pillow." For many years it has been in the graveyard of Dromore Cathedral, and is now in Canon Lett's charge. CHARLES BULLA : a " baton du commandment," and some old linen stamps, about eighty years old. W. H. PATTERSON : glass slag from the site of the old glasshouse at Ballycastle, fragments of pottery from the site of extinct pottery works near Larne Harbour, and objects of flint from the bed of the River Shesk, at Ballycastle.

Various photographs were shown by A. Morris, S. N. Douey, Adam Speers, A. M'I. Clelland, G. W. Shaw, and R. Welch. F. J. Bigger had a collection of coloured shields with decorative devices from the early crosses of County Down ; also drawings and photographs of Castle Sean.

At nine o'clock a lantern display was given, at which views illustrating the summer excursions of the Club were shown by F. J. Bigger, S. H. Douey, W. A. Green, D. J. Hogg, H. L. Orr, S. Wear, and R. J. Welch.

Previous to the lantern display the President addressed the meeting, and welcomed the country members and friends of the Club. Canon Lett said that in this their fiftieth year they have two original members exhibiting, a remarkable testimony to the study of natural science as a healthy recreation. The average attendance at the summer excursions was forty-two, a distinct improvement on 1911—and, although the summer of the past year was a wet one, rain never interfered with any of the excursions. The working of the junior section promises to be a success. The celebration of the fiftieth anniversary of the Club's foundation will be held next May. A good programme has been arranged, and it is expected that many delegates from our sister clubs in England will attend the meeting. The election of eight new members—Miss D. Forth, Miss H. Ledgerwood, and Messrs. R. M'Creary, J. W. Dunlop, N. J. Ledgerwood, R. Long, S. M. Macoun, and R. J. Wright—terminated the meeting.

DUBLIN NATURALISTS' FIELD CLUB.

NOVEMBER 12.—CONVERSAZIONE.—The Twenty-seventh Winter Session was opened on Tuesday, November 12th, with a conversazione in the Royal Irish Academy House. 76 members and visitors attended, a decrease of 33 on the numbers present at the corresponding function for last year. In the unavoidable absence of the President, the chair was taken by the Vice-President, N. COLGAN, M.R.I.A., who welcomed the visitors and the members of the Belfast Naturalists' Field Club that were present. A lecture was given by Professor G. H. CARPENTER, B.Sc., M.R.I.A., on various microscopic objects of biological interest, which he illustrated by lantern projections. At the close of the lecture the Vice-President drew attention to the present condition of the Club, and made an earnest appeal for new members.

A large number of exhibits were on show during the evening, of which the principal are given in the following list :—J. ADAMS, M.A. : (a) Diatoms from the Kieselguhr deposit at Toome Bridge ; (b) Hairs on the leaf of *Deutzia*. E. C. R. ARMSTRONG, M.R.I.A. : Some types of Stone Implements. C. F. BALL : Hybrids of *Saxifraga umbrosa* and *Saxifraga Gzum*. Richard M. BARRINGTON, LL.B., F.L.S., M.R.I.A. : Some Irish specimens of the large race of Wheatear, *Oenanthe leucorhoa*, Irish Wrynecks, and Barred Warblers. N. COLGAN, M.R.I.A. : Microscopic slides illustrative of the tongues of the Mollusca, and the dermal deposits of the Holothuroidea. G. P. FARRAN, B.A., M.R.I.A. : Echinoderms from deep water off the West Coast of Ireland. A. C. FORBES, M.R.I.A. : (a) Radiophotographs of wood ; (b) Microscopic sections of wood. W. F. GUNN : Some Photo-micrographs of seeds. J. N. HALBERT, M.R.I.A. : (a) Some exotic Bird-butterflies (Ornithoptera) ; (b) a few interesting insects from Clare Island. T. HALLISSY, B.A., M.R.I.A. : (a) Erratics from the drifts of Co. Wexford ; (b) some fossils from Kiltorcan ; (c) Rock-specimens from the interbasaltic zone, Co. Antrim. J. DE W. HINCH : Shells and erratics from the deposits of North Mayo. Miss M. C. KNOWLES : Wax models of some common flowers. A. R. NICHOLS, M.A., M.R.I.A. : (a) Two Little Auks, captured in Co. Dublin, February, 1912 ; (b) Birds' nests from Sierra Leone. A. ROYCROFT : (a) Carboniferous fossils from St. Doulagh's, Co. Dublin ; (b) Striated limestone boulder from Benhead Marl. C. M. SELBIE, B.Sc. : Living Tree-frogs (*Hyla arborea*). R. SOUTHERN, B.Sc., M.R.I.A. : Irish Marine Worms. Miss J. STEPHENS, B.Sc. : (a) Living Lizards ; (b) Deep-sea Sponges. S. G. WILD : Curious and interesting Plants. Miss EDITH H. WILSON : (a) Skeletons of Pigeon, Frog, Weasel, and Carp ; (b) Prepared Fish ; (c) Mounted Dragon-fly and Locust ; (d) Brazil Nut. Miss F. M. POLLOCK : Sparrow-hawk's Eggs. R. CLARK : (a) Upper Silurian Fossils from Clogher, Co. Down ; (b) Comic Sketch by the late Mr. E. T. Hardman ; (c) Photographs of past Officers of the Geological Survey of Ireland. R. LI. PRAEGER, B.A., B.E., M.R.I.A. : Geological Skit, by the late Mr. W. H. Baily. R. WELCH, M.R.I.A. : Land and Freshwater Shells, Irish and British.

DECEMBER 10.—W. F. GUNN (President) in the chair. Thirty-two members and visitors were present. Officers and Members of Committee having been nominated for the coming year, T. Hallissy opened a discussion on the present condition of the Club, in which the President, Miss Conan, Prof. Carpenter, and Messrs. Halbert, Barrington, Praeger, and Dunlop also took part. At the close of the meeting a number of interesting exhibits were shown, demonstrations in every case being given by the exhibitors. J. N. HALBERT exhibited a ground beetle, *Platyderus ruficollis*, new to Ireland; C. M. SELBIE, a specimen of the deep-sea decapod, *Polychelis granulatus*; R. LL. PRAEGER, some hybrid Saxifrages; W. F. GUNN, statoblasts of *Cristatella mucedo*, a fresh-water Polyzoan; N. COLGAN, radulae of Marine Mollusca, and spicules of holothurians.

DUBLIN MICROSCOPICAL CLUB.

NOVEMBER 13.—The Club met at Leinster House, D. M'ARDLE (Vice-President) in the chair.

W. F. GUNN exhibited seed of *Cineraria cruenta*, the well known and extensively-grown greenhouse plant, belonging to the order Compositae. It is a native of the Canary Islands, and was introduced to cultivation in 1777. The seeds were shown by reflected light under a magnification of 24.5 diameters ($1\frac{1}{2}$ -inch objective). They are roughly cylindrical in form, tapering slightly at one end with rather prominent ridges running longitudinally from top to bottom. Between these ridges, in perfect specimens, are two rows of scales which in appearance closely resemble those on the wings of butterflies and moths, and these were the appendages to which particular attention was drawn. They are apparently modified hairs, which are so often found on the seeds of other genera of this order. Being perfectly white in colour they show up distinctly on the black or dark brown surface of the seed.

D. M'ARDLE showed one of the foliose group of the Hepaticae, *Cephalozia connivens* Dicks. The whole plant, which was in fruit, is of a very delicate and fragile structure, and excepting the stem which is about one inch long and eight cells thick, all the other parts consist of rows of single cells. The stem is frequently flagelliferous, bearing copious root-hairs which convey moisture to the delicate plant body. The leaves are sub-orbiculate in shape, divided to one-third from apex, segments acuminate, connivent, cell-walls thick, leaves all decurrent. The bracts surrounding the perianth in three pairs, the inner twice as long as the leaves, divided into three or five subulate segments, the perianth is pyriform in shape, ciliate at the mouth, calyptra very short and delicate, capsule oblong, globose. The species is evenly distributed in wet bogs through Ireland, found also in England, Scotland, the Continent, and in North America.

Prof. G. H. CARPENTER showed specimens of *Glyciphagus domesticus*, a tyroglyphid mite, which he had received in a sample of oatmeal from Co. Cork, drawing attention to the elegantly slender legs and the delicately plumose bristles which characterise this species. It is a widely distributed store-house "guest" in Great Britain, and is probably of general occurrence in Ireland.

NOTES.

BOTANY.

Irish Water-plants.

From some notes made by Professor Hugo Glück, of Heidelberg, in Ireland last year, and recently received from him, I extract the following ;—*Ranunculus Flammula* var. *alismifolius* Glaab.—Rosslare, Co. Wexford, with *R. hederaceus* ; at Weir Bridge, near Tuam, N.E. Galway. *Oenanthe fluviatilis*, Colem.—Weir Bridge, N.E. Galway (*f. submersa* and also half submerged forms).

Utricularia ochroleuca, Hartm.—Sparingly in Glendalough Lake, Recess (deep-water form), and between Recess Hotel and Station (shallow-water form), W. Galway.

Alisma Plantago × *ranunculoides*.—Turlough Bog, near Tuam, and between Turlough Bog and Tuam, N.E. Galway.

Alisma ranunculoides f. zosterifolius Fr.—Near Recess, W. Galway, and near Tuam, N.E. Galway.

R. LL. PRAEGER.

Dublin.

Ammi majus in County Down.

A colony of about twenty individuals of this plant was discovered in June, 1912, in the County of Down, near Strangford Lough, by an English botanist, Dr. F. W. Stansfield, of Reading. Some of the plants were in flower, and I had the pleasure of exhibiting a young plant from the locality to the members of the Belfast Naturalists' Field Club, at their meeting on the 19th of November. The leaves of this plant bear a great resemblance to the fronds of *Pteris serrulata*, and the likeness was distinct in the young plant, which might easily have been taken for a young fern of the above species. The leaves are different from those of any other Umbellifer found in the British Islands, being bi- to tri-primately parted into oblong or oblanceolate acutely serrulate leaflets. It grows in sandy soil, and has a very long tap root. *Ammi majus* is noticed in the second edition of "Cybele Hibernica," p. 490, as follows :—"Portmarnock Sands,¹ 1821.—Mack. Cat.—Seen here for several years in succession, by Mr. John Bain. A casually introduced plant of Southern Europe, which has long since disappeared." It does not seem to have been found elsewhere in Ireland, as there is no mention of it in Praeger's *Irish Topographical Botany*. It is remarkable that *Ammi majus*, which is a native of the Mediterranean littoral, has been found in County Down, growing not very far from another plant, also a native of the shores of the Mediterranean, viz., *Glyceria festucaeformis*. Concerning this *Glyceria* there was some correspondence in the *Irish Naturalist*, 1904, pp. 72, 79, where I advocated the view that the grass had probably been introduced with barley imported to Comber distillery from a Mediterranean port ; it is curious now to find another plant from that region established in County Down.

H. W. LETT.

Loughbrickland, Co. Down.

Plants of Antrim and Down.

Mr. A. W. Stelfox has sent me recently two plants which are worthy of notice in these pages. One is *Saxifraga umbrosa*, "from a glen $2\frac{1}{2}$ miles N.N.E. of Hillsborough. It was in as natural a habitat as could possibly be imagined, but, as you will see, it is a garden variety of the species." This station matches one reported by Mr. Thomas Greer for *Saxifraga Geum*—a wild, small glen in Co. Tyrone, along one edge of which, however, a road ran. Both these Saxifrages are often grown in gardens, and they possess great vitality, so that a piece thrown down may with luck take root and grow; probably these facts help to account for their occurrence in several places where they cannot be considered native. Mr. Stelfox's other plant is *Arctostaphylos Uva-ursi*, which he reports as growing in some quantity on the side of a gully on Agnew's Hill, Co. Antrim. The Bear-berry is extremely rare in the north-east, and had not been seen there for over seventy years till re-discovered by Mr. Lilly (a single colony) at Skerrywhinny, in 1908.

R. LL. PRAEGER.

Dublin.

ZOOLOGY.

Formalin as an Insecticide.

Owing to the remarkable efficiency of formaldehyde as a germicide and fungicide, some experiments were made in the plant houses of this College to determine its insecticidal power. Various solutions of Schering's formalin in water were used, giving graded strengths of formaldehyde from .01 to 2 per cent. These were sprayed over plants infected with green fly and mealy-bug. The results showed that any efficacy formalin might possess as an insecticide was more than counterbalanced by its injurious action on the plants.

J. CHARLES JOHNSON.

University College, Cork.

The Medicinal Leech in Ireland.

Dr. Scharff, in an article on "The Irish Freshwater Leeches" (*Irish Naturalist*, vol. vii., 1898), refers to the occurrence of the Medicinal Leech (*Hirudo medicinalis*) in Lough Mask, in 1849. The writer has recently had occasion to refer to an article by P. L. Simmonds on "The Trade in Leeches," in the *Pharmaceutical Journal* (3), i., 1870 (pp. 521-2), in which the following statement is made:—"Lord Desart lately let a piece of marsh land of about 40 acres on his estate near Callan,

Wexford, to a company of Frenchmen, who immediately fenced it in and, having freely irrigated it from an adjoining stream, proceeded to sow it down under a leech crop. The seed, if we may so express it, was contained in sacks, each holding 15,000 leeches, which were scattered from the hand just as corn is sown."

It would be very interesting to know the subsequent history of this leech "farm." Dr. Scharff states that his efforts to obtain an Irish specimen of the Medicinal Leech have been fruitless. This locality might prove fruitful if carefully searched. If the species is found there, a careful record should be made of the colour pattern for comparison with the plates in Ebrard's "*Sangues Médicinales*" (1857), where local varieties are carefully described, and thus a clue to their probable origin be obtained. Of course, this is "counting the chickens before they are hatched," but until last year it was thought that the Medicinal Leech was extinct in England. My friend, Mr. Wm. N. Blair, has recently obtained several specimens from the New Forest.

H. WHITEHEAD.

Toynbee Hall, London, E.

Common Eider Duck in Co. Wexford.

An immature male Common Eider Duck (*Somateria mollissima*), shot on the south end of the South Slob, Wexford Harbour, on the 12th November, 1912, has been sent to the Dublin Museum by Colonel J. J. Perceval.

This Duck is a rare straggler to Ireland, chiefly to the northern coast, and Mr. Ussher, in *Birds of Ireland*, only mentions two specimens from Co. Wexford, one obtained previously to 1834 and the other in 1876.

The first nesting of the Common Eider in Ireland (Co. Donegal) has recently been announced in *British Birds*.

A. R. NICHOLS.

National Museum, Dublin.

Siberian Skylark in Co. Cork.

Dr. Hartert, of Tring, has most kindly examined for me some Skylarks obtained from Irish light-stations, and has detected amongst them a specimen of *Alauda arvensis cinerea*, killed striking at the Old Head of Kinsale, Co. Cork, October 7th, 1910. The only other British record of this lark from Western Siberia is the Scottish specimen from the Flannan Islands, obtained February 24th, 1906 (W. Eagle Clarke, in *Ann. Scot. Nat. Hist.*, 1906, p. 139).

R. M. BARRINGTON.

Fassaroe, Bray.

BOTANISTS OF THE NORTH OF IRELAND.

BY REV. CANON H. W. LETT, M.A., M.R.I.A.

(Presidential Address to the BELFAST NATURALISTS' FIELD CLUB,
19th November, 1912.)

THE botanists of whom this paper treats are those whose botanical work was carried on in the northern part of Ireland, or who were natives of the province of Ulster. Of these several will be mentioned whose names have not hitherto appeared in any published list of the botanists of Great Britain and Ireland. And a few particulars will be added to what has been already recorded concerning others who have long since obtained a place amongst the botanists of the North of Ireland.

Sir Hans Sloane, one of the most distinguished men whom the County Down has produced, was born at Killyleagh in 1660. His library and natural history collections, bequeathed to the nation, became the nucleus of the British Museum. A full account of his life will be found in *Sir W. Jardine's "Memoir of Sir Hans Sloane,"* and in the "*Dictionary of National Biography.*"

There was a contemporary of Sloane's who if anyone ever did, deserves to be reckoned as a botanist: this was *Sir Arthur Rawdon*, born 1662, died 1695, grandfather of the celebrated Earl of Moira, and ancestor of the present Marquess of Hastings. He built a residence at Moira, in Co. Down, where he had extensive gardens with "walks, vistas, a labyrinth, canals, ponds, and groves," laid out in the fashion of the time around it. In all this he was inspired and encouraged by Sloane's consignments and distributions of foreign plants, and he sent out his own gardener, one James Harlowe, to Jamaica to bring from thence some exotic trees and plants for the gardens at Moira. There is no record of the result of this experiment. But Rawdon sought for trees in more temperate regions; and Walter Harris, in his "*History of the County Down,*" which was published in 1744, gives the names of nine trees and plants that were then remaining and growing well in the Moira Demesne. And thirty years ago there were three

of the rare trees still in existence. While one of the plants, the *Acorus Calamus* or Sweet-scented Flag, which had been planted in Sir Arthur's ponds has disappeared, together with the ponds, it has taken up its abode in the long level of the Ulster Canal, between Moira and Blaris, as our local botanists well know. Sir Arthur is quite forgotten at Moira, not a trace of his mansion remains, while of his beautiful gardens the only thing left now are the depressions where formerly were the ponds and canals.

As a further proof of Sir Arthur having been a botanist, I may mention, that William Sherrard, who died in 1728, visited Sir Arthur Rawdon at Moira, from which he explored the Mourne Mountains, and the shores of Lough Neagh.

John Templeton was born in Belfast in 1766, where he died and was buried in 1825. In any notice of North of Ireland botanists a prominent place must be assigned to his name and work. His life was short, but strenuous. He lived in an age when the study of botany was making progress in Great Britain, and in the investigation of the plants of Ireland he gave much assistance to several British authors in whose works it is duly acknowledged, but he himself published very little.

However, he had intended to publish a "Flora Hibernica" and he had the work well in hand. The manuscript and drawings for this are still in existence, and are evidence of his painstaking researches and industry. He aimed to make his work as perfect as was possible, and when some of his friends urged him to complete and publish his "Flora" it was his diffidence that held him back.

The authors whom Templeton helped by sending them specimens, were:—Sir James Edward Smith in "English Botany" and "Flora Britannica," Louis Weston Dillwyn in "British Confervae," Dawson Turner in "British Fuci" and "Muscologia Hibernica," Dubourdieu's "Histories of Antrim and Down," and Sampson's "History of Londonderry."

The MSS. left by Templeton consist of seven volumes. One of these is a small 8vo. half bound; it is in the Library of the Royal Irish Academy, and contains 280 pp. of lists

of Cryptogams, chiefly mosses, with their localities. In this book is inserted a letter from Miss F. M. More, sister of Alexander Goodman More, to Dr. Edward Perceval Wright, Secretary, Royal Irish Academy, dated March, 1897, in which she says—"The Manuscript which accompanies this letter was drawn up between 1794 and 1810, by the eminent naturalist, John Templeton, in Belfast. It was lent by his son, Dr. R. Templeton, to my brother, Alex. G. More, when he was preparing the second edition of the '*Cybele Hibernica*,' on condition that it should be placed in the Library of the Royal Irish Academy afterwards."

The other six volumes are quarto size, and contain 1,090 folios, with descriptions of many of the plants, and careful drawings in pen and pencil and colours of many species. They are now lent to the Belfast Museum. About ten years ago I spent a week in examining these volumes, and as their contents have hitherto never been fully described, I would like to give an epitome of my investigation of them.

Vol. I.—*Phanerogams*, 186 folios, with 15 coloured figures, and 6 small drawings in the text.

Vol. II.—*Fresh-water Algae*, 246 folios, 71 of which are coloured.

Vol. III.—*Marine Algae*, 212 folios, of which 79 are coloured figures. At the end of this volume are 3 folios of Mosses, the pagination of which runs with the rest of this volume, but it is evident they had at some time been misplaced.

Vol. IV.—*Fungi*, 112 folios.

Vol. V.—*Mosses*, 117 folios, of which 20 are coloured, and also 73 small drawings in the text.

Vol. VI.—*Mosses and Hepatics*. 117 folios are Hepatics, 40 of which are in colours; 96 folios are Mosses, of which 39 are full-page coloured figures; and in addition there are 43 small coloured drawings in the text.

All these drawings were executed by Templeton himself, they are every one most accurately and beautifully drawn; and the colouring is true to nature and artistically finished; those of the mosses and hepatics being particularly good.

Templeton is not mentioned in Tate's "Flora Belfastiensis," published in 1863, at Belfast. The earliest published reference to his MSS. is in the "Flora of Ulster," by Dickie, published in 1864, where there is this indefinite allusion—"To the friends of the late Mr. Templeton I am indebted for permission to take notes of species recorded in his manuscript." The MS. was most likely the small volume now in the Royal Irish Academy Library.

In the introduction to the "Flora of the North-east of Ireland" (1888), there is a brief biographical sketch of Templeton, but no mention of any MS. However, in a "Supplement" to the Flora (1894), there is this note—"Templeton, John, four volumes of his 'Flora Hibernica' at present deposited with the Belfast Natural History and Philosophical Society, contain much original matter, which could not be worked out in time for the present paper." This fixes the approximate date of the MSS. being loaned to the Belfast Museum. They were not known to the authors of the "Cybele Hibernica" in 1866, while in the second edition (1898) the small volume of the MSS. in R.I.A. Library is described in the Index of Authors under its full title—*Catalogue of the Native Plants of Ireland, by John Templeton, A.L.S.*

Rt. Rev. Richard Mant, D.D., son of Rev. Richard Mant, born at Southampton, 12th February, 1776, died at Ballymoney, Co. Antrim, 1848, and was buried at Hillsborough. He had been a Scholar of Winchester, and then Fellow of Oriel, Oxford, and in 1820 became Bishop of Killaloe, and in 1823, Bishop of Down, and lived at Holywood in a residence now incorporated with the Palace Barracks. He was distinguished as a divine and commentator on the Bible, an accomplished preacher, and a sacred poet. From his college days he was a keen botanist, and was familiar with all our native plants. There is a good life-sized portrait of him in Culloden House, Cultra.

My father, who was one of his examining chaplains, used to tell a good anecdote about Mant and a Belfast gentleman; one day after dinner as the party strolled round the garden, the Bishop's Presbyterian friend plucked a leaf of the plant *Aegopodium Podagraria*, and presenting

it asked :—" Mr. Bishop, how is it that my gardener tells me that the worst weed he has to contend with is ' Bishop's Weed ' ? " " And " replied Dr. Mant—" My gardener says the most troublesome weed in my garden is called ' Elder-weed ' " !

The *Very Rev. Holt Waring*, born 1766 and died 1850, who was rector of Shankill and Lurgan, and Dean of Dromore, had a most delightful garden at his residence, Waringstown House, close to the village of the same name in Co. Down. There was in it a choice collection of rare trees and shrubs, and hardy foreign as well as native plants, and there was also a fine rock-garden in one part of it, with a large collection of hardy Ferns, and a pond for choice aquatics. A peculiarity of the whole was that every plant had a legible label with the proper scientific name. I saw it sixty-five years ago when it was in its perfection; it was my first introduction to a good collection of Ferns, and till quite recently I never saw a better. This garden flourished till the end of the last century.

There was a family named Hancock, long resident in Lisburn, one of whom, *Dr. Thomas Hancock*, born in that town in 1783, was a botanist and skilful physician, who eventually settled in London.

George Dickie, born in Aberdeen in 1812, became Professor of Natural History at Belfast in 1849. He returned to his native city in 1860 as Professor of Botany in Aberdeen University, and in 1864 he published his well-known and useful little " *Flora of Ulster*," where his botanical field work in the North of Ireland is fully recorded. A short biography of him appears in the " *Flora of the North-east of Ireland*."

Rev. William Hind, a member of a well-known Belfast family, born in Belfast 1815, died in Suffolk 1894, was curate of Derryaghy, Co. Antrim, in 1839. His herbarium of British plants is in the herbarium of Trinity College, Dublin.

Professor Ralph Tate, F.L.S., born at Alnwick, Northumberland, and died in 1901 at Adelaide, South Australia. Author of " *Flora Belfastiensis*," published in 1863, which gives the results of his investigations of the plants in Down

and Antrim, within a radius of fifteen miles from Belfast. He taught for many years natural science classes which the Government established in Belfast, and in 1863 in conjunction with a number of his pupils founded the Belfast Naturalists' Field Club. A full account of this will be found in the *Irish Naturalist*, 1902.

Catherine Gage, born 1816, on Rathlin Island, where she died 16th February, 1892, and is buried, took a great interest in its native flora; she made a series of drawings, correctly executed, of the greater part of the plants. Her list of the plants is very complete, the Dicotyledons being 204, and the Monocotyledons 21; it was prepared for the Botanical Society of Edinburgh, and an abstract was published in the *Annals and Magazine of Natural History* for the year 1850.

James R. Garrett, of Holywood, Co. Down, solicitor, born 1820, died 1855, who is known to Belfast zoologists as co-editor with Robert Patterson, of vol. iv. of Thompson's "Natural History of Ireland," in addition to being a zoologist was a student of the plants of the North-east of Ireland. He was one of the first fern-fanciers of the district, and had at Holywood a fernery in which were grown specimens of all our native ferns, with several of their fancy varieties. I have now in my fernery two fine plants of *Lastrea Filix-mas* var. *cristata* which originally came from his garden.

Rev. Richard Oulton, born in 1812, at Cooldagh, near Ballymoney, Co. Antrim, died at Holywood, in 1880, was curate of St. Anne's, Belfast, Chaplain to the Forces, and Registrar to the Queen's College. He was a keen botanist, and was intimate with the plants of the Counties Down, Antrim, and Armagh, and knew all the localities for the rarer species. He had formed a good herbarium of the local plants, which twenty years after his death on the demise of his widow, was sold, together with some other natural history collections and his library, in Belfast.

In the second edition of "Cybele Hibernica" (1898), at p. 520, is the following correction of a notice of a very rare plant that was omitted in error from its proper place in the book—" *Euphorbia Peplis* L. Garraris Cove, near

Tramore, Waterford (Miss Trench); Mackay, 1859—and spec. in Herb. Mackay in Trinity College, Dublin. First found by Miss Trench in 1839, but not since seen, though sought for by R. M. Barrington in 1870 and 1871, and by H. C. Hart in 1882. No doubt extinct.” I may add that the Rev. C. H. Waddell searched for this plant with me in 1902, but we did not find it. The locality is two miles south of Tramore, and the disappearance of the plant may be accounted for by the removal every year of large quantities of the beautiful gravel forming the beach and headlands at the spot.

This lady, *Helena Trench*, born in Dublin 1820, died at Killiney 1908, and buried at Loughbrickland, was a daughter of the Rev. F. S. and Lady Helena Trench. She married Jeffrey Lefroy, Vicar of Aghaderg, and subsequently Dean of Dromore. In early life she was an enthusiastic botanist, and student of Irish and Continental plants, the taste for which she had inherited from her mother. Her large and well-preserved herbarium was given by her in 1885 on the death of her husband when the family left the North of Ireland, to the Banbridge Young Men’s Christian Association.

George Crawford Hyndman, born in Belfast 1796, died at Belfast 1867, was a botanist as well as a conchologist. On his death a large collection of his shells was purchased for the town of Lurgan, where it still exists in the town hall. He had an excellent herbarium, which passed to his nephew, Mr. Hugh Hyndman, LL.D., and he was well acquainted with the plants of Ulster.

William Thompson, born at Belfast, 2nd November, 1805, died in London, 17th February, 1852, author of the “Natural History of Ireland,” gave attention not only to the vertebrate and invertebrate animals (except Insecta and Infusoria), but also to the vegetable kingdom in all its various forms; he was truly a many-sided naturalist, and may fairly be claimed as a botanist. Some departments of cryptogamic botany gave exercise to his powers of observation, as shown by his paper—“On a minute *Alga*, which colours Ballydrain Lake,” and more especially by the number of localities contributed by him to Professor

Harvey's splendid work, "*Phycologia Britannica*." Dickie in the preface to the "*Flora of Ulster*" acknowledges the botanical memoranda of the late Mr. W. Thompson as having furnished valuable information for the "*Flora*," in the pages of which are numerous records of his collecting of various plants. And in the Belfast Museum is a herbarium formed by Thompson, which is of itself an enduring evidence of his industry and research in the fruitful fields of botany. An account of his life was published in the posthumous vol. iv. of his "*Natural History of Ireland*."

David Moore, F.L.S., was born at Dundee 1807, and died at Dublin 1879. He came to Ireland, one of those able adventurous Scotchmen who have done so much for science in this island, in 1828, as assistant to Jas. T. Mackay, the director of Trinity College Botanic Gardens; and in 1835 he received an appointment as botanist on the Ordnance Survey of Ireland. The district which Moore surveyed was County Londonderry and part of Antrim. His discoveries are recorded in the "*Phytologist*" (1857), in Colby's "*County Derry*," in his own "*Synopsis of the Mosses of Ireland*," in the *Proceedings* of the Royal Irish Academy (1872), and in his "*Report on Irish Hepaticæ*" in *Proceedings* of the Royal Irish Academy (1876). A brief biography will be found in the "*Flora of the North-east of Ireland*."

Thomas Drummond, A.L.S., died at Havana, Cuba, 1835. Came from Forfar on the formation of the Belfast Botanic Gardens, of which he was the first curator. He did not remain long in Belfast, but made good use of his time collecting Mosses, which were subsequently published in a folio without any letterpress under the title "*Musci Scotici*," though a large number of the specimens are Irish. There is a copy in the Belfast Museum Library.

Lady Kane, née Katherine Baily, born 11th March, 1811, died at Dublin 15th February, 1886, was authoress of the "*Irish Flora*," Dublin, 1833. A considerable number of plants are first recorded from Down and Antrim in this volume.

Theobald Jones, F.L.S., Admiral, M.P. for Londonderry, was born at Dublin, 1790, and died there 12th February,

1868. He contributed papers on lichens to the *Proceedings* of the Dublin Natural History Society. His large herbarium of Lichens is preserved in the National Museum, Kildare Street, Dublin.

David Orr, engaged in Glasnevin Gardens under Dr. Moore, 1854, retired 1882, died at Dublin 1892. He had resided in Belfast, where he noted many plants, some of them very rare mosses, as occurring in the district; but a suspicion of error has fallen upon a portion of his work, and deprived it of the value it otherwise would have had.

“The Flora of the North-east of Ireland,” by *Samuel Alexander Stewart*, F.B.S.E., A.L.S., and *Thomas Hughes Corry*, F.B.S.E., F.L.S., published in 1888 by the Belfast Naturalists’ Field Club, marks an epoch in the work of the botanists of the North of Ireland. It contains the results of the work of nearly all the botanists who have investigated the plants of our district, and no other part of Ireland, except Co. Dublin, has as yet been so well examined.

T. H. Corry, born at Belfast in 1860, was drowned in Lough Gill, Co. Sligo, 4th August, 1883, while exploring for a botanical report, and with him his friend Mr. *Charles Dickson*, a solicitor of Belfast, who was also an enthusiastic botanist, and was helping in the investigation. Mr. Corry was a diligent worker, and had already attained a position amongst rising botanists beyond what his twenty-three years seem to warrant. He was lecturer on Botany in the University Medical and Science Schools, Cambridge; and assistant curator of the University Herbarium.

Stewart was thus left to carry on the preparation of the Flora for the press, and he took the greatest care in testing every record that it was possible to test and to confirm. This was a feature of his life. He never took anything for granted, and therefore his botanical work is thoroughly reliable. His care in this respect was so great as occasionally to disturb some of his friends and helpers, but it was a good quality. He contributed several important reports on Irish botany to the *Proceedings* of the Royal Irish Academy.

A most interesting biographical sketch of Stewart's life, by Rev. C. H. Waddell, B.D., will be found in the Annual Report and Proceedings of the Belfast Naturalists' Field Club for 1910-11, pp. 410-434, and in the *Irish Naturalist* for October, 1910. And in the same number of the *Irish Naturalist* is a contribution by Mr. Praeger on Stewart's work, together with a complete list of his writings.

It is a tragic and remarkable coincidence that Stewart's death, like that of his coadjutor on the "Flora of the North-east of Ireland" was the result of an accident. He died from injuries received by falling on the pavement in Ann Street, Belfast, on 15th June, 1910.

Rev. Samuel Arthur Brennan, B.A., T.C.D., born 1837, died 1908 at Cushendun and buried at Cushendall, was a keen botanist, and never thought any trouble too much or any walk too long in looking for a rare plant. He worked principally amongst the flora of Antrim, Armagh, and Tyrone, and contributed notes to the *Journal of Botany* and *Irish Naturalist*, and specimens to other workers. He left his herbarium to his friend, Mr. William Hancock, who deposited it in the Belfast Museum.

Canon John Grainger, D.D., Rector of Skerry and Rathcavan, born 1830 at Belfast, died 1891 at Broughshane, where he is buried, and who gave his immense collections, of stone and metal antiquities and coins, geological specimens insects, and shells, and library to the city of Belfast, though best known as an antiquary and geologist, was also a botanist. In the preface to "Flora Belfastiensis," the author acknowledges the assistance he received from him in the compilation of that book, and nothing gave him greater pleasure than to return home from one of the Naturalists' Field Club excursions bringing something new to add to his herbarium.

John Henry Davies, born at Penketh, near Warrington, 1838, died suddenly at Belfast 20th August, 1909, spent the greater portion of his life in Ireland. In very early life he developed a taste for botany, making a speciality of mosses, and corresponding with Professor W. H. Harvey, of Trinity College, Dublin, and William Wilson, of Warrington. Specimens of Mosses collected by him in Wicklow

and Kildare in 1857, in which neighbourhood he then lived, are preserved in the herbarium of Trinity College. He contributed papers on the Mosses of Antrim and Down to the *Phytologist* and *Irish Naturalist*, from 1857 to 1907.

Henry Chichester Hart, B.A., F.L.S., was born at Raheny, Co. Dublin, 29th July, 1847, and died at Carrablagh, on the shores of Lough Swilly, 7th August, 1908. He did a very large amount of field-work between 1873 and the end of the century, parts of nearly every county in Ireland receiving his attention. He specialized in the Flora of Co. Donegal. In Praeger's "*Irish Topographical Botany*" are listed fifteen papers on the plants of that county's botany alone, which he contributed to the *Journal of Botany* and *Proceedings* of the Royal Irish Academy. This material was eventually summarized in his well-known "*Flora of County Donegal*." A short account of his life and work, from the pen of his friend, R. M. Barrington, appears in the *Irish Naturalist* for December, 1908.

Mrs. Mary Isabella Leebody, who died in 1911 at Londonderry, did good botanical work for many years, and added many records for the county in which she resided. She is frequently mentioned in the *Irish Naturalist*.

Rev. George Robinson, M.A., Rector of Tartaraghan, Co. Armagh, born 1824 (?) died 1894, was a careful and ardent botanist, and contributed many records of the rarer plants from Co. Armagh to Dickie's "*Flora of Ulster*."

Rev. W. T. Whan is mentioned frequently in Dickie's "*Flora*" as the collector of uncommon plants in counties Armagh, Londonderry, and Tyrone.

Another botanist who contributed to Dickie's records was *W. H. Ferguson*, of Belfast, who was a pupil of his.

A friend of Dickie's, *William Millar*, was a teacher in Belfast, who had always been very desirous of promoting a taste for botany among his private pupils. He had an enthusiastic love for the native plants of his country.

Doctor Mateer was another Belfast botanist who also helped by his own work to foster a love of the study of botany. A *Miss Maffet*, of Belfast, is mentioned by Stewart in the Introduction to the "*Flora of North-east Ireland*."

She appears to have been a botanist, but I have been unable to discover anything about her.

Rev. William Somerville Smith, of Antrim, died 1912, was intimate with the littoral flora of Lough Neagh. He published (1885) a little book—"Gossip about Lough Neagh," which gives the names of the plants that grow around that lake.

James Townsend Mackay, A.L.S., M.R.I.A., was born at Kirkcaldy, Fife, 1775, and died at Dublin 1862. He published in the *Transactions* of Royal Irish Academy, vol. xiv., 1825, "Catalogue of Plants found in Ireland." In 1836 he published "*Flora Hibernica*," in which there are many northern records of Phanerogams and Cryptogams.

Whitley Stokes, M.D., born at Waterford 1763, died at Dublin 13th April, 1845, was a friend of Templeton's, with whom he collected plants in Ulster.

Robert Scott, M.D., died before 1813, discovered *Dicranum Scottii* at Swanlinbar. He worked at mosses of the North of Ireland for Dawson Turner.

Edmund Murphy, 1828-65, landscape gardener, of Dublin, contributed localities for plants from several northern counties, to Mackay's "*Flora Hibernica*."

Francis Whitla, of Belfast, 1830-53, later of Dublin, knew Irish plants well, and contributed to "*Flora Hibernica*."

Richard Kennedy, a young and promising botanist, found, in 1817, *Hottonia palustris* near Downpatrick.

[If any reader of these pages can supply any information about any of the last-named thirteen botanists, I hope he will communicate with the writer.]

Letitia Hannah Damer Sandys, born 1840, in the Isle of Wight, and educated in America, came to Ireland, and married Benjamin Nicholson White-Spunner, who became Rector of Donaghmore, Co. Tyrone; she died 1911. She was a naturalist of wide tastes, her speciality being botany. She prepared and exhibited a herbarium in book-form of the wild flowers of Ireland, which was exhibited at the Chicago Exhibition; this collection is now preserved by her son, who resides in Co. Meath.

James Shanks, born 4th November, 1854, died 2nd November, 1912, at Ballyfounder, near Portaferry, was an intelligent and successful farmer, who for his recreation studied the botany, archaeology, and geology of the district of Little Ards, in County Down. He took a great interest in the native plants of his locality, and every year exhibited large collections of the wild flowers of the Ards at all the local flower shows. He had made himself a pyramidal revolving stand for these occasions, which held a great many flowers, and enabled all to be easily examined by the visitors. Mr. Shanks was of a retiring and modest disposition, and never made a parade of his learning.

ADALARIA PROXIMA

AN ADDITION TO THE IRISH NUDIBRANCH FAUNA.

BY NATHANIEL COLGAN, M.R.I.A.

At the monthly meeting of the Dublin Microscopical Club held on the 11th December last, Professor Bayley Butler exhibited some living nudibranchs which he had dredged the day before in about 2 fathoms in the Malahide River. The specimens, which were handed over to me for identification, included, in addition to *Ægires punctilucens*, *Goniodoris nodosa*, and *Eolis Drummondi*, all previously recorded for this locality, two small pale yellow Dorids about 11 mm. in length. On a superficial examination of these I referred them, not without hesitation, to *Doris aspera* of Alder and Hancock, a species which is already on record for the Malahide River as well as for other stations on the Dublin coast, and which occasionally occurs in yellowish forms though usually pure white. About a fortnight later, however, having found time to examine the radula or lingual ribbon of one of the specimens, the peculiar form of this organ placed it beyond all doubt that the species was not *Doris aspera* of Alder and Hancock, but *D. proxima* of the same authors.

These two species, which in general aspect are closely similar, are figured by their authors on the same plate (Plate 9, Family I.) of the "Monograph of the British Nudibranchiate Mollusca" and farther on in the same work an excellent drawing of the radula[†] is given in Plate 46—Tongues of the Dorididae. In describing *D. proxima* the authors suggested that the very marked character of the radula, which at once separates this Dorid from *D. aspera*, might be held by some naturalists to justify its reference to a distinct genus. This suggestion has since been acted on, Bergh having in 1878 in Vol. ii. of Semper's "Reisen im Archipel der Philippinen" (Malacologische Untersuchungen, Heft xiv.) founded the new genus *Adalaria* on the *Doris proxima* of Alder and Hancock. In addition to the type species Bergh's genus includes *A. Lovéni*, on record for Bantry Bay and the coasts of Norway and Sweden, and three Northern Pacific species, *A. virescens* Bergh, *A. pacifica* Bergh, and *A. albopapillosa* (Dall). As to the systematic position of *Adalaria*, Eliot places it between *Acanthodoris* and *Lamellidoris* in his division *Pseudodorididae* of the *Phanerobranch Dorids*. This division is restricted to temperate seas, and to it is probably referable the only known instance of a fresh-water nudibranch, *Ancylodoris baicalensis* from the Siberian Lake Baikal.

In the text to their plate 46 Alder and Hancock state that the radula of *Doris proxima* has no central plate. In the radula of the Malahide specimen, however, a few small, flat, centrally-grooved median plates were detected at the anterior end. Although the number of the lateral uncini was in places difficult to make out owing to the small size of the extreme inner and outer members of the row, the lingual formula was clearly the same as that given by Sars in his "Mollusca Regionis Arcticae Norvegiae," i.e., 10-I. 1. I-10., the large numerals here representing the conspicuous hooked laterals, one on each side of the median line. In his Plate XIV., fig. 1b, Sars gives a figure of the radula of *Doris Lovéni* where the median tooth or plate accurately represents the form of the corresponding plate observed in the Malahide specimen of *D. proxima*. The fact is that the median teeth are really present in both

species though easily overlooked in *D. proxima* as might be expected from their description as given by Sars: *Lamellae radulae medianae minimae et rudimentares non contiguae* (p. 308). The number of transverse rows of teeth in the Malahide specimen was 42, and the median plates were apparently confined to the anterior end, becoming rudimentary or obsolete farther back. Bergh¹ in describing the Adalarian radula calls these imperfectly developed median teeth false tooth-plates (*falsche Zahnplatte*).

As showing the difficulty of separating *D. proxima* from *D. aspera*, to which it bears so marked a superficial resemblance, it is of interest to note that Sars in his classical work just referred to (p. 308) states that the single specimen of *D. proxima* which he dredged off the Lofodens in from 10 to 20 fathoms was labelled *D. aspera* by his father (the famous marine zoologist, Michael Sars). Anatomical examination, however, showed with absolute certainty that the specimen belonged to *D. proxima*, first described by Alder and Hancock, and afterwards taken in Kiel Bay by Meyer and Möbius. The lingual formula for *D. aspera* it may be mentioned here is 2-I. 1. I-2.

A careful search through the extant literature of the Irish Marine Mollusca shows that *Adalaria proxima* has not been previously recorded for Irish waters. We may safely then congratulate Professor Bayley Butler on this interesting addition to our Nudibranch fauna. The species appears to be confined to the North Atlantic, ranging from Dublin northward to the Lofodens, and so far as I can discover its only British stations are the estuaries of the Mersey and the Dee, Puffin Island, Anglesea, and St. Andrews. Now that attention has been drawn to it, and the value of its lingual formula in distinguishing it from *D. aspera* has been pointed out the species will probably be detected in other Irish stations.

I am indebted to Mr. A. R. Nichols for assistance in tracing the literature of the genus *Adalaria*.

¹ Gattungen der nordischen Doriden. *Archiv für Naturgeschichte*, 1879, p. 36.

REVIEW.

BRITISH AND IRISH LICHENS.

A Hand List of the Lichens of Great Britain, Ireland and the Channel Islands.

By A. R. HORWOOD. London : Dulau & Co. Price 1s. net. Pp. 45.

We do not think British Lichenologists will receive this Hand List of Mr Horwood's with much enthusiasm. The present seems a particularly inopportune moment in which to produce it. A bare list which is intended for reference in field-work and for use in the herbarium should almost of necessity be founded on some accessible standard work where the species listed are described, and where the synonymy is given. In the present instance the only modern British work of the kind is the "Monograph of the British Lichens in the Herbarium of the British Museum." But this work is in a transition stage. The second volume has only been published a short time ago, and the second edition of vol. i. of which the first edition appeared in 1894 is in course of re-arrangement, and may be expected in a year or so. So under these circumstances we think Mr. Horwood would have been wiser to have postponed the compilation of his list until the complete work was available.

As it is he has followed closely the arrangement and nomenclature of Vol. II. Indeed he tells us in the introduction that it would have been "a work of supererogation" to have made any alterations in it, but into the arrangement and nomenclature of Vol. I. he has introduced many changes and innovations. It would be impossible in a short notice like this to criticise these alterations in detail; we can only say that many of them seem to us unjustifiable. Moreover, we do not consider that a Hand-List of this description—a mere list of species—where no explanation or reason can be given for the changes, is the place in which important alterations in nomenclature and classification should be made, and certainly not without correlating the new arrangement with the old.

The inaccuracies of the volume are not confined to matters of a technical character. For instance, we notice that Mr. Horwood has included Massalongo and Schneider amongst the European writers on Lichens of the last twenty years. But Massalongo died in 1860, and Schneider is an American.

M. C. K.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Long-eared Owl from Mr. W. Moore Lawrenson, a Rainbow Trout from Mr. F. C. Kenning, and 15,000 eggs of Brown and Rainbow Trout from the Irish Fisheries Office. A Cow-bird has been received on deposit, and two Black-faced Spider Monkeys and a pair of Marmosets have been purchased.

DUBLIN MICROSCOPICAL CLUB.

DECEMBER 11. The Club met at Leinster House, THE PRESIDENT (J. H. Woodworth) in the chair.

C. F. BALL showed photographs of a new epiphytal orchid called *Angraccum Andersonii*, a native of the Gold Coast, West Africa. It has a short stem three inches long, which grows downwards, and from which hang roots eighteen inches in length. The stem bears small flowers of an almost transparent white with green stripes on the sepals, and a green column. The special interest attached to this orchid is that it is leafless, the aerial roots doing the work of attachment, absorption, and assimilation of food. A section of the root showed the cortical cells full of chlorophyll, a thin velamen for absorption of moisture, and strong root hairs which serve for attachment.

F. W. MOORE showed portion of the leaf of a hybrid *Sedum*, obtained from the late William Corderoy. The leaves were covered with large unicellular glandular hairs which secreted from the apex a drop of clear glutinous fluid. These glandular hairs formed very interesting objects when examined under a low power.

W. F. GUNN showed scales from the underside of the leaf of *Eleagnus japonicus*. This plant, which is a native of China and Japan, grows naturally in dry positions, so that it is desirable to limit the amount of transpiration through the leaves. The scales, which are very closely set on the lower surface of the leaves where the stomata are numerous, help materially to do this. Under ordinary light the scales are quite transparent and featureless, but the use of polarized light enables the structure to be seen much more distinctly, and the use of a selenite disc greatly intensifies the colours.

N. COLGAN exhibited a series of slides illustrating the microscopic structure of the replum or false dissepiment in the Cruciferae. An examination of some forty-five species of European crucifers appeared to the exhibitor (whose researches in this direction are as yet incomplete) to justify the conclusion that a generic character is afforded by the varied patterns formed by the system of fibres traversing the replum. In the genus *Alyssum*, of which seven distinct species had been examined, the constancy of type in this pattern was shown to be specially well marked. In other genera, too, *e.g.*, *Arabis*, *Cardamine*, *Draba*, *Lepidium*, *Cochlearia*, *Thlaspi*, *Diploxys* and *Brassica*, of which a lesser number of species had been examined, ranging from five in *Arabis* and four in *Cardamine*, to three each in the remaining six genera, this constancy of type was found to obtain. The variety in the form and disposition of the fibres traversing the replum in the species so far investigated, renders it not improbable that a specific character for each of the numerous species of Cruciferae provided with a replum may be found in the microscopic lineation of that portion of the fruit. It remains to be seen whether a classification of the Cruciferae, founded on such a character, would run parallel with existing classifications drawn from more obvious distinctive marks. Indications of the existence of such a parallelism are not wanting. It

is hardly necessary to insist on the value in certain lines of research of microscopic characters of this kind, provided always, that their constancy has been well established.

D. M'ARDLE exhibited specimens of *Prionolobus Turneri*, one of the most curious of the minute leafy Hepaticæ, possessing traits of character bordering on several sub-genera. The fresh specimens were in fruit, and the leaves and stems showed the cell-structure which is very delicate, beautifully guttulate, the walls and angles thickened. The leaves are in two rows, bilobed, the whole margins irregularly spinosely dentate, and often doubly so. The perianth projects beyond the bracts, of which there are from one to three pairs, the innermost twice the size of the leaves; it is composed of a single layer of cells except at the base and angles where there are two layers; the mouth is closely ciliate. The calyptra is very fragile, and the oval capsule was burst open to show the chocolate-coloured spores and bispiral elaters of the same colour. The first notice we have of the plant being found in Ireland, is given in Sir William Hooker's "British Jungermanniæ" (where there is an excellent figure and description at tab. 29), found on a shady bank of a mountain rivulet, near Bantry, Co. Cork, by Miss Hutchins, and he writes—"I cannot promise myself a more grateful task than that of dedicating a small but elegant species to Dawson Turner, Esq." The date of Miss Hutchins collecting the plant would be about 1811, and no specimens were found in any part of Ireland during the long interval of sixty-two years, until Professor Lindberg, of Helsingfors, found a small quantity on a wet sandy bank at Cromaglown, Killarney, in 1873, and once again it has been found by the exhibitor luxuriating in the County Wicklow, in October, 1912, after an interval of thirty-nine years, in a new station far from its home in the south-west. In England it is very rare, and has been reported from Sussex and Warwick; in Wales from Dolgelly; also in Guernsey, France, the Canary Islands, N. Africa, and the coast counties of California.

J. N. HALBERT exhibited an Oribatid mite *Hypochthonius rufulus*, Koch, found amongst moss collected in County Mayo. It is the only species of the genus known to occur in Ireland, but has not been previously recorded. The species is remarkable for its bright red colouring, the division of the abdomen into two nearly equal parts, and the beautifully pectinate stigmatic organs. It was supposed at one time to represent an immature form (nymph) but this has been proved erroneous by A. D. Michael, who has bred larvae from ripe eggs obtained from these mites. A few of the Irish specimens were observed to contain large-sized eggs

BELFAST NATURALISTS' FIELD CLUB.

NOVEMBER 27.—GEOLOGICAL SECTION.—Microscopic Exhibits and Demonstrations. W. J. C. TOMLINSON, Chairman of the Section, presided.

Mr. TOMLINSON's exhibit consisted of a series of microscopical sections of volcanic rocks of acid type, including rhyolites from Tardree, Templepatrick, Ballycloughan, Cloughwater, and Orritor quarry, west of

Cookstown. He also showed slides of the three types of basalt which occur in Scrabo quarry, of the coarse-grained basalt from the probable volcanic neck at Ballymoney, near Holywood, and of the basic dyke in Kilcoan quarry, Island Magee.

Dr. DWERRYHOUSE exhibited slides of epidiorite and hornblende-schist from the Loch Assynt district of the north-west Highlands of Scotland.

Miss M. D. MITCHELL and Miss REA showed a micro-section of a siliceous oolite from the vicinity of the State College, Pennsylvania.

Mr. MAXWELL exhibited slides of Irish marbles, Newry and Mourne granites, nummulitic limestone, and coal; also a micro-section, showing fossil cellular structure, leaves and rootlets. Diatoms, Foraminifera, &c., were included in his exhibit.

ROBERT BELL showed interesting hand specimens, including a very large Pleurotomaria from the Chalk of Moneymore, chalcedony from the same district, and phacolite from Craig-a-heilliar, Portrush.

SYLVANUS WEAR's exhibit included fine slides made by himself of local basalts and dolerites, and asbestos from Ligoniel.

Miss M. K. ANDREWS showed microscopic sections of rocks from the Mourne district, also of a diabase dyke at Scawt Hill, remarkable for its beautiful pleochroic augite, and a slide of the adjoining chalk completely altered into a calc-silicate hornstone.

DECEMBER 17.—ARTHUR R. DWERRYHOUSE D.S.C., F.G.S., M.R.I.A. lectured on "Some Geological Features of Scotland and their Relation to the Structure of the North of Ireland." The lecturer directed his attention chiefly to the Archaean and older Palaeozoic rocks, as the great "Caledonian" earth-movements which above all others determined the structure of the North of Ireland took place at the end of the Silurian period. The structure of the North-West Highlands of Scotland was dealt with at some length, and it was shown that the Eweisian gneiss, the oldest rock known in the British Isles, had been formed by the crushing and shearing of a great complex of basic igneous rocks. The sequence of events prior to the deposition of the Torridon Sandstone was shown to be a complex and lengthy one, including (a) the intrusion of the igneous rocks; (b) their conversion into gneiss by mechanical deformation; (c) the intrusion of four sets of igneous dykes; (d) further earth-movements which converted the dykes into epidiorites, hornblende-schists, mica-schists, &c.; (e) great denudation of the land-surface, which removed the cover under which the igneous rocks and gneisses had been formed. The formation of the Torridon Sandstone was followed by earth-movements and extensive denudation, and later by a downward movement of the land, which sank beneath the level of the sea in which the Cambrian rocks were subsequently deposited. At a later date after the formation of the Ordovician and Silurian rocks a still more stupendous series of earth-movements set in, producing the enormous thrust-planes and reversed faults so characteristic of the North-West Highlands. Attention was drawn to the natural division of Scotland into four great structural areas—viz. (1) the North-West Highlands; (2) the Eastern and Central High-

lands; (3) the Central Valley (Clyde and Forth Valleys); and (4) the Southern Uplands, and the last three were shown to extend into Ireland, and were traced across the island to the Atlantic coast. Particular attention was drawn to the close similarity both in nature and arrangement existing between the Ordovician and Silurian rocks of the Southern Uplands of Scotland and those of County Down and the neighbouring districts, while many of the quartzites and limestones of the Central Highlands between the Caledonian Canal and the Grampian Fault were shown to have their counterparts in the counties of Londonderry, Donegal, and Tyrone. At the conclusion of the lecture R. J. WELCH raised some questions on the subject matter of the paper. W. J. C. TOMLINSON also commented on the interest of the paper, and pointed out how necessary it was that more work should be done on the same lines in Ireland as has been done by the Geological Survey in Scotland. Dr. Derryhouse having replied, the Chairman conveyed to Nevin H. Foster the congratulations of the Club upon his election as a Fellow of the Linnean Society. He also expressed the regret that the Club is about to lose two of its members, Mr. and Mrs. Balfour-Browne, who are leaving for England.

DECEMBER 26.—A small band of members travelled to Downpatrick and proceeded on foot to St. Patrick's Holy Wells, Struell. After ascending Slievenagryddle, a protruding boss of igneous rock was examined. Several good specimens showing the junction of it and the Silurian rocks were obtained. In most cases near the junction what appeared to be "junction-breccia" was observed. Some exposed surfaces of the Silurian rocks near the summit showed traces of severe glaciation. The glacial striae ran from north to south. Close to the highest point a small overflow channel or "dry gap" was pointed out. The descent of the hill was made to Lough Money, and after a visit to the stone circle at Ballyalton the party returned to Downpatrick. A brief visit to the grave of St. Patrick in the grounds of the Cathedral was made before tea.

DUBLIN NATURALISTS' FIELD CLUB.

JULY 13, 1912.—EXCURSION TO NEWLY-MADE LAND AT NORTH WALL.—A party of twenty members and visitors assembled at the Custom House Quay, and travelled down the river in steam launches. After landing near the lighthouse, the party proceeded by the miniature railway to the newly-made land, which is an eastward extension of the North Wall formed by the accumulation of mud and sand dredged from the bed of the river by the dredgers of the Port and Docks Board. The conductor, Mr. J. W. Griffith, M.INST.C.E., escorted the party, and gave an interesting account of the history and formation of this ground. A brief examination of the rank flora, which has migrated into the area, was made. Several species of land shells were found, which had probably reached their present habitat *via* the Tolka river. Mr. and Mrs. Griffiths very kindly provided tea in the open air, and after some desultory collecting, the party embarked once more and returned to town.

NOTES.

ZOOLOGY.

Rhantus exoletus in County Mayo.

As the above Water-beetle is not included in Mr. Balfour-Browne's list of aquatic coleoptera from Clare Island and adjacent mainland—"Clare Island Survey" (*Proc. R.I.A.*, vol. xxxi.)—the capture of a specimen in a small lake near Westport, which is included in the district, in August, 1911, may be worth recording. I am indebted to Mr. Halbert, of the Dublin Museum, for kindly naming the insect for me.

L. H. BONAPARTE WYSE.

Ealing Common, London, W.

Notes on Irish Beetles.

In a recent paper (*Entom. Month. Mag.* (2), xxi., p. 62), J. N. Halbert records many of the rarer beetles occurring at Shane's Castle, on the north-eastern shore of Lough Neagh. Some of the more interesting species such as *Cryptophagus bimaculatus* and others, have already been noted in the *Irish Naturalist* (xix., p. 32). Amongst the species not mentioned in this latter reference is the black variety of *Paramecosoma melanocephalum*, Herbst., which replaces the type form in Ireland; a varietal name (var. *infuscatum*) is proposed for this insect. A large brown form of the same species, with stronger puncturation, which would seem to be referable to the variety *univeste*, Reitter, also occurred in the same locality.

G. C. Champion records (*Entom. Month. Mag.* (2), xxi., p. 70), the capture by F. Bullock of an example of *Grammoptera ruficornis*, F., var. *pallipes*, Steph., at Killarney. We are glad to hear that Mr. Bullock, who collected with great success in the Dublin district some years ago, is continuing his entomological work in the south-west of Ireland, where there has always been an absence of resident collectors of coleoptera.

P. Cameron records (*Entom. Month. Mag.* (2) xxi., p. 280), an example of a rare rove-beetle, *Atheta* (*Homolota*) *picipennis* Mann., from Rathmullan, County Donegal. It was taken on the wing on July 4th, 1909. Apparently this is the second recorded occurrence of the species in these islands; and it confirms Dr. Joy's previous record of *Homalota picipennis* as a British insect.

In the *Entom. Month. Mag.* (2), xxii., p. 153, F. Balfour-Browne describes a new species of *Haliplus* which he calls *H. nomax*. It belongs to the difficult "*ruficollis*" group of the genus, and occurs in canals, lakes, and large drains of clear water, in England, Scotland, and Ireland.

Some useful notes on the nomenclature and habits of the British and Irish species of *Longitarsus* are supplied by Messrs. Tomlin and Sharp in a recent paper (*Entom. Month. Mag.* (2) xxii., p. 241). We may point out that the insect usually recorded from Ireland as *Longitarsus ater*, F.,

should be referred to under the name *L. parvulus*, Payk. It is a species of economic importance, and is well known in the north-east of Ireland, on account of the injury it causes to the flax crops. The authors record it as occurring in abundance on low trees in a wood near Ballycastle, Co. Antrim.

A rove-beetle new to science (*Bledius secerdendus*) has been recorded (*Entom. Month. Mag.* (2) xxii., p. 269) by Dr. Joy, being an addition to the known beetle fauna of Ireland. The species is probably mixed with the common *Bledius arenarius* in British collections. The Irish specimens were captured by Dr. Joy three years ago at Cloghane in County Kerry.

Insects at Coolmore, Co. Donegal.

Mrs. Johnson and I spent from August 19th to September 20th at Coolmore revisiting our old hunting-grounds there, but not with our previous success. Insects were decidedly scarce, owing, no doubt, to the cold and wet of the summer. However, we worked away, taking full advantage of any sunshine that we were favoured with, and succeeded in getting a few insects, though very far from what we had hoped for. Beetles were anything but plentiful. Seaweed, which generally yields a rich harvest, was almost a blank. I did not see a single *Dyschirius*, and hardly any *Bledii*, the only species met with being the common *B. arenarius*. Other denizens of the seashore were *Bembidium atrocoeruleum* Steph., *B. bruxellense* Wesm., *B. saxatile* Gyll., *Aleochara succicola* Thoms., *Homalota vestita* Grav., and *Cafius xantholoma* Grav. On the sandhills, in dead rabbits, I found a good many *Choleva grandicollis* Gr., and with them a couple of *C. Watsoni* Spence. There were very few *Aphodii* about, but Mrs. Johnson obtained a specimen of *A. foetens* F., a few examples of *A. scybalarius* F., and *A. fimetarius* L., ab. *castaneus*, Bouskell. On Iris there were a number of *Aphthona nonstriata* Goeze, and a few *Chalcoides smaragdina* Foudras, occurred on sallow. *Chrysomela Banksi* F., was very common, even crawling on the window-sills. The only Weevils that I obtained were *Apion haematodes* Kirby, and *Otiorrhynchus rugifrons* Gyll.

As might be expected in such a season, Lepidoptera were not abundant. I was therefore agreeably surprised on one of the fine sunny days we had in September to find two fine fresh specimens of *Vanessa io*. On ragweed I took *Hydraecia nictitans*, one of which had the stigmata bright orange, *H. micacea*, and *Chareas graminis*. At night a few moths came to the lamp in the sittingroom, the most plentiful being *Orthosia limosa*, besides it I may mention *Heliotropa fibrosa* and *Noctua glauca*. I found a nice specimen of *Ennomos alniaria* sitting on a window. *Cidaria testata* occurred pretty freely, and I took a couple of *Teras caudana* by beating hedges. The larvae of *Cerura vinula* were pretty common on willows and sallows, and those of *Lasiocampa rubi* were quite plentiful; besides these I met with single specimens of the larva of *Smerinthus populi* and *Acronycta rumicis*.

W. F. JOHNSON.

Poyntzpass.

A few more Irish Ichneumonidae.

The ichneumon flies recorded by Claude Morley (*Entom. Month. Mag.* (2), xxii., p. 19) were collected by J. N. Halbert, mostly on expeditions organised by the Royal Irish Academy Fauna and Flora Committee. He remarks that some of the species are of considerable rarity, as for instance *Prolarchus rufus*, Grav., an insect which is parasitic in the cocoons of large saw-flies of the genus *Cimbex*. The twelve species recorded are as follows—*Protichneumon fuscipennis*, Wesm., Forth Hill, Co. Wexford. *Ichneumon molitorius*, Grav., Santry Demesne, Co. Dublin. *Platylabus dimidiatus*, Grav., Muckross. *Glyphicnemis profligator*, Fab., Woodford, Co. Galway. *Exolytus laevigatus*, Grav., Bog of the Ring, Co. Dublin. *Cryptus tarsoleucus*, Schr., Ross, Co. Galway. *Meniscus murinus*, Grav., Mangerton, Co. Kerry. *Exetastes cinctipes*, Retz., Lambay. *Prolarchus rufus*, Grav., Lough Dan, Co. Wicklow, September, 1908. *Henicospilus ramidulus*, Lim., Kilcool, Co. Wicklow. *Campoplex falcator*, Thumb., Mangerton. *Aphanistes ruficornis*, Grav., Glandore, Co. Cork.

Carrion Crow at Lambay.

Mr. Francis Mason (steward to the Hon. Cecil Baring) reports to me that he and his son have seen on several occasions, during the last three weeks, a Carrion-crow at Lambay. Mr. Mason states that both he and his son have resided in England for a number of years, and that they are well acquainted with the different species of the Crow tribe, and that they have no doubt of the identity of the bird.

GEORGE C. MAY.

Dublin.

Late Stay of Swifts.

In the *Irish Naturalist* for December (vol. xxi., 1912, p. 246) I find two notes under the above heading, which commence with—"Despite the coldness of August (and the Summer) the Swifts did not depart," &c. If the writer had stated—"Because of the cold August and Summer," &c., it would have been (in my opinion) more in accordance with the actual facts. If any readers are sufficiently interested in this subject I would refer them to the *Naturalist*, 1907, pp. 111-114; wherein I recorded my observations on a colony of Swifts for nineteen consecutive years. But sufficient for the present notice is the fact that I found that in fine summers the Swifts left earlier than in cold and wet ones, and summarised thus:—"My observations seem to show that with this species the date of their departure is fixed more by the forwardness of the young brood, and by their ability to undertake the long journey, than by the state of the weather, or of their food supply, at the time of leaving. I find that in the finest summers, and consequently when there is the largest supply of winged insect food, this colony usually breaks up a day or two earlier than in colder and wetter seasons, and they will leave sometimes when there is apparently an unlimited supply of food

about. Nesting appears to be their sole object here, and as soon as this is completed their restless and active spirits fall an easy prey to the migration 'fever.' "

H. B. BOOTH.

Ben Rhydding, Yorkshire.

Recent Notices of Irish Birds.

Robert Warren records fifteen or sixteen White Wagtails (*Motacilla alba*) seen at Bartragh Island, co. Mayo, on April 25 on their spring migration (*Zoologist*, August, 1912).. He also notes Black-tailed Godwits seen in September in Cork Harbour and on the Shandon Estuary, Co. Waterford (*Zoologist*, October, 1912). R. M. Barrington records a Barred Warbler (*Sylvia n. nisoria*) received from Rockabill in September (*British Birds*, November, 1912), and in the same number N. H. Foster records an instance of Sheld-Duck (*Tadorna tadorna*) and Red-breasted Merganser (*Mergus serrator*) laying in the same nest in Co. Down, and Rev. C. W. Benson records a Great Skua (*Stercorarius s. skua*) seen at Laytown in October, 1908.

BOTANY.

Rare Mosses in Counties Antrim and Derry.

I wish to record a few interesting finds of Mosses made in these counties. *Breutelia arcuata* with fruit in young stage, at Legavallon, between Garvagh and Dungiven, also at Craighall, near Kilrea. *Grimmia Hartmani*, a single tuft by the Bann below Rasharkin. *Dicranella Schreberi* var. *elata*, several places near Kilrea. *Ephemerum serratum*, grows in small quantities in fields along side the Bann on both the Antrim and Derry sides of the river near Kilrea. *Hypnum fluitans*, fruits in some abundance round some of the lakes near Kilrea. *Hypnum stramineum*, margins of lakes near Kilrea. Rev. C. H. Waddell has very kindly examined the above, and says they are correctly named.

J. D. HOUSTON.

Kilrea.

NEWS GLEANINGS.

F. Balfour-Browne, M.A.

Our hearty congratulations to Mr. F. Balfour-Browne, who after several years' work in the botanical department at Queen's University, Belfast, has been appointed to a newly-established lectureship in Entomology at Cambridge. We understand that the new post affords considerable facility for research, of which our friend's record assures us that every advantage will be taken.

ADDITIONS TO THE DISTRIBUTIONAL
RECORDS OF WOODLICE IN IRELAND

TILL THE END OF 1912.

BY D. R. PACK BERESFORD, B.A., M.R.I.A., and NEVIN
H. FOSTER, F.L.S., M.R.I.A.

SINCE the publication of our paper¹ giving the known distribution of Woodlice in Ireland up till the end of 1910, forty-six new county-records have been listed in this group. Of these, two species—*Trichoniscus tomentosa* and *Nagara nana*—are new to Ireland, but can only be regarded as artificial introductions. We have again to thank the following correspondents who have kindly aided by sending us specimens:—Miss A. B. Foster, Messrs. J. N. Halbert, H. L. Orr, W. H. Patterson, R. A. Phillips, A. W. Stelfox, N. E. Stephens, and R. J. Welch. The subjoined annotated list furnishes particulars of these new county-records up till the end of 1912, as well as further localities in which some of the less plentiful species have been obtained, with the initials of the finder in each case. In this list the asterisk denotes that our paper published in March, 1911, contained previous records from those county-divisions to which it is affixed.

***Ligia oceanica* (Linn.).**

We have now proof of the existence of this species in every maritime county-division, and also a record from the non-maritime county of Kilkenny, in a similar situation to that in which it was found in Co. Armagh.

11. Bank of River Suir, Kilkenny (A.W.S.).
15. Oranmore, Galway S.E. (R.A.P.).

***Trichoniscus vividus* (Koch).**

Mr. Stelfox reports this species as very numerous in the marshes in Co. Wexford.

12. Ballyteige, Kilaun, and Castlebridge, Wexford (A.W.S.).

¹ *Proc. R. I. Acad.*, vol. xxix. (B), no. 4.

Trichoniscus roseus (Koch).

6. Mount Congreve, Waterford (D.R.P.B.).
 10.* Cloughjordan, Tipperary N. (R.A.P.).
 11. Near Waterford City (A.W.S.), and Thomastown (R.A.P.),
 Kilkenny.
 20.* Valley between Bray and Enniskerry, Wicklow (A.W.S.).
 22. Beauparc (N.H.F.), and Kells (A.W.S.), Meath.
 30. Cavan Town (N.H.F.), Cavan.
 32. Rossmore Gardens (N.H.F.), Monaghan.
 36. Baronscourt (N.H.F.), Tyrone.
 37.* Loughgall (N.H.F.), Armagh.
 39.* Ballycastle (N.H.F.), Antrim.

T. pygmaeus G. O. Sars.

During the past two years we have been enabled to add this species to the faunal lists of nine county-divisions, and are of opinion that eventually it will be found in every county in Ireland. With the exception of Mayo W., we have discovered it in every division in which we had opportunity of searching for it; and, as in our experience it is more readily found in winter or early spring, it may be that had our visits to that county occurred at a different time of year, we should have succeeded in taking it there also. It may be noted that Mr. Stelfox's finding of *T. pygmaeus* in Mayo E. occurred in the month of November.

11. Near Waterford City, Kilkenny (A.W.S.).
 12. Ardcavan, Wexford (A.W.S.).
 13.* Pollmounty, Carlow (A.W.S.).
 20. Bray, Wicklow (A.W.S.).
 22. Beauparc, Meath (N.H.F.).
 26. Manulla, Mayo E. (A.W.S.).
 29. Kinlough, Leitrim (A.B.F.).
 30. Cavan Town, Cavan (N.H.F.).
 31. Termonfeckin, Louth (N.H.F.).
 32.* Rossmore demesne, Monaghan (N.H.F.).
 33. Castle Caldwell, Fermanagh (N.H.F.).
 37.* Loughgall, Armagh (A.W.S. and N.H.F.).
 39.* Colin Glen and Murlough Bay, Antrim (A.W.S.).

T. Stebbingi Patience.

This species has in Ireland been found only in greenhouses, and consequently must be regarded as exotic.

38. Hillsborough, Down (A.W.S. and N.H.F.).
 39. Botanic Gardens and Crawford's Nursery, Belfast, Antrim
 (A.W.S. and N.H.F.).

Trichoniscoides albidus (Budde-Lund).

20. Bray (A.W.S.), and Greystones (N.E.S.), Wicklow.
 27.* Westport, Mayo W. (J.N.H.).

Trichorina tomentosa Budde-Lund.

This Venezuelan species has only been taken in one place in Ireland.
 (See *Irish Naturalist*, vol. xx., p. 154).

39. Botanic Gardens, Belfast, Antrim (H.L.O., A.W.S., R.J.W.,
 and N.H.F.).

Haplophthalmus Mengii Zaddach.

As anticipated, this beautiful little species appears to have a wide
 distribution in Ireland, but has been generally found in the vicinity of
 the coast.

5. Mallow, Cork E. (A.W.S.).
 12. Kilaun, Wexford (A.W.S.).
 20. Bray, Wicklow (A.W.S.).
 26. Manulla, Mayo E., (A.W.S.).
 29.* Kinlough, Leitrim (A.B.F.).
 37. Loughgall, Armagh (N.H.F.).
 38. Belvoir Park, Down (A.W.S. and N.H.F.).
 39. Ballycastle, Antrim (N.H.F.).

Platyarthus Hoffmannseggii, Brandt.

We have no new county-records for this species, but Mr. Stelfox found
 it in the Counties of Waterford, Wexford, and Carlow in the nests of
 three species of ant, viz. :—*Formica rufa*, *Lasius flavus*, and *L. niger*.
 In Wexford he found numerous specimens under stones where no ants'
 nests were visible.

Porcellio pictus Brandt.

6. Near Waterford City, Waterford (A.W.S.).
 30. Near Cavan Town, Cavan (N.H.F.).
 32. Camla House, Monaghan (N.H.F.).
 33. Castle Caldwell, Fermanagh (N.H.F.).
 36. Gortin, Tyrone (A.B.F.).
 37.* Loughgall, Armagh (N.H.F.).

P. dilatatus Brandt.

- 16.* Railway bank near Galway City, Galway W. (R.A.P.).
 20. Greystones, Wicklow (N.E.S.).
 27.* Clare Island, Mayo W. (A.W.S.).
 32. Rossmore gardens, Monaghan (N.H.F.).

Nagara nana Budde-Lund.

Of this exotic species from Madagascar only one specimen, so far as we know, has been taken in Europe. (See *Irish Naturalist*, vol. xx., p. 154).

39. Botanic Gardens, Belfast, Antrim (A.W.S. and N.H.F.).

Metoponorthus pruinosus (Brandt).

With the exception of a single specimen found under a plank in the goods-yard at Armagh railway station, all our fresh localities for this species are from greenhouses. It proved exceedingly numerous in one of the warm melon-houses in Rossmore gardens.

30. Cavan Town, Cavan (N.H.F.).
 32. Rossmore gardens, Monaghan (N.H.F.).
 36. Baronscourt, Tyrone (N.H.F.).
 37. Loughgall, and Armagh City, Armagh (N.H.F.).
 38.* Dickson's nurseries, Newtownards, Down (A.W.S. and N.H.F.).

Cylisticus convexus (De Geer).

4. Mallow, Cork Mid (A.W.S.).
 11.* Near Waterford City, Kilkenny (A.W.S.).
 12. Castlebridge, Wexford (A.W.S.).
 20. Bray, Wicklow (A.W.S.).
 34.* Bundoran (very numerous), Donegal E. (N.H.F.).
 36. Baronscourt, Tyrone (N.H.F.).
 38.* Belvoir Park, Down (A.W.S. and N.H.F.).

Armadillidium vulgare Latreille.

We have no fresh county records for this species, for which careful search has been continued in several Ulster counties.

- 38.* Ardglass (A.W.S.), and Newry (N.H.F.), Down.

A. nasatum Budde-Lund.

We took a specimen in Belvoir Park greenhouses, Co. Down, measuring 12.5 x 7 mm., this being the largest example hitherto found in Ireland.

36. Baronscourt, Tyrone (N.H.F.).
 38.* Dickson's nurseries, Newtownards, Down (A.W.S. and N.H.F.).

Fenagh House, Bagenalstown,
 Hillsborough, Co. Down.

SOME ADDITIONAL RECORDS OF IRISH BEETLES,

CHIEFLY FROM CO. MEATH.

BY G. W. NICHOLSON, M.D.

In pursuance of my destiny always to go to Ireland at a time when beetles are scarce, I spent the month of July, 1912, at Balrath. The summer species one expects to find on flowers and by sweeping were absent, and it was only by pulling moss, sifting refuse, and such methods, that I succeeded in finding anything at all.

There are, however, two additions to the Irish list. These are :—

Clambus punctulum, Beck.—I found a single specimen of this species in moss on the banks of a stream at Cabra Castle, Co. Cavan, within a hundred yards of the Meath county boundary.

Enicmus histrio, Joy.—Occurred at Balrath in lawn mowings. This identification has been verified by Dr. Joy himself.

Another species, though apparently an introduced member of our fauna, is noteworthy :

Ptinus tectus, Boiel.—It was with more pleasure than surprise that I encountered a couple of specimens of this insect walking about in Balrath House at night. This species has spread widely in England during recent years, and its appearance in Ireland (as first recorded in 1908 by G. H. Carpenter)¹ was to be expected.

Among my other captures the following, which I have not previously recorded from this district² deserve mention :

Hydroporus incognitus, Sharp ; *Limnebius truncatellus*, Thoms., common in moss on stones in a small shallow stream ; *Helophorus aquaticus*, L., var. *aequalis*, Thoms., one specimen

¹ *Econ. Proc. R. Dublin Soc.*, vol. i., p. 587, pl. liv.

² *Irish Naturalist*, vols. xix. and xx.

in a ditch on the "home bog"; *Atheta* (*Homalota*) *xanthop-tera*, Steph., a specimen by sweeping; *Autalia rivularis*, Grav., in moss; *Mycetoporus splendidus*, Grav., common in hay refuse; *Philonthus ventralis*, Grav., *Leptacinus linearis*, Grav., common in lawn mowings; *Lithocharis ochracea*, Grav., a few in company with the last two; *Dianous cærulescens*, Gyll., in numbers with the *Limnebius*; *Stenus pubescens*, Steph., *S. binotatus*, Ljun., among reeds; *Bythinus validus*, Aubé, I got a fine series from moss in various parts of the estate, but always under fir-trees; *Eumicrus tarsatus*, Müll., abundant in lawn mowings; *Anisotoma calcarata*, Er., one under a stone; *Saprinus nitidulus*, Pk., common in carrion; *Sericoderus lateralis*, Gyll., in lawn mowings; *Epuraea pusilla*, Er., on cut pine-stumps; *Rhizophagus cribratus*, Gyll., *R. ferrugineus*, Pk., under bark; *Monotoma picipes*, Herbst, *M. longicollis*, Gyll., both these species were equally abundant in lawn mowings; *Lathridius lardarius*, de G., in lawn mowings; *Corticaria elongata*, Humm., by beating pine-tops; *Cryptophagus affinis*, Sturm, in moss; *Atomaria apicalis*, Er., in lawn mowings; *Typhaea fumata*, L., common in pine-tops; *Grammoptera ruficornis*, F.; *Donacia versicoloreæ*, Brahm., one specimen in the round pond; *D. simplex*, F., *D. discolor*, Panz., common on the "home bog"; *Deporaus betulæ*, L., on aspen in bog wood; *Alophus triguttatus*, F.; *Myelophilus piniperda*, L., common in the saw-pit.

An hour's collecting in the demesne of Cabra Castle, Co. Cavan, along the banks of a rocky stream on a very wet day, produced the following species:—

Bembidium tibiale, Duft., *B. flammulatum*, Clairv., both in some numbers under stones; *Quedius auricomus*, Kies., one, *Dianous cærulescens*, Gyll., in numbers, *Stenus Guynemeri*, Duv., one, in moss behind a waterfall; *Rhizophagus perforatus*, Er., under bark.

THE CLARE ISLAND SURVEY—BOTANY.

With the issue of Mr. Cotton's report on the Marine Algae in November, the publication of the Systematic Botany of the Clare Island Survey is completed.

Other papers on botanical subjects—Mr. Forbes' report on "Tree-growth," and Mr. Lewis' on "Peat-deposits," have still to appear, but the enumeration of the flora of the district, from Phanerogamia to Algae, is now complete. The extent of the six reports which make up this part of the Clare Island work may be shown thus :—

Group.	Author.	Pages.	Plates.	Price.
Phanerogamia and Pteridophyta	R. Lloyd Praeger	112	6	s. d. 4 0
Musci and Hepaticae	Rev. Canon Lett	18	—	0 6
Fungi	Sir H. C. Hawley and Carleton Rea.	26	1	1 0
Lichens	Miss Lorrain Smith	14	—	0 6
Marine Algae ..	A. D. Cotton ..	178	11	5 0
Fresh-water Algae ..	William West ..	62	2	2 0
Total ..		410	20	13 0

The results, from a statistical point of view, may be shown similarly as follows, in number of species recorded :—

Group.	Total.	New to Ireland.	New to British Isles.	New to Science.
Phanerogamia and Pteridophyta	465	—	—	—
Musci	221	—	—	—
Hepaticae	127	7	—	—
Fungi	802	295	11	2
Lichens	280	34	1	—
Marine Algae ..	437	92	18	3
Fresh-water Algae ..	887	157	25	6
Total	3,119	585	55	11

All the reports deal with the flora of both Clare Island itself and the neighbouring mainland, except that on the Phanerogamia, in which attention is confined to Clare Island and the neighbouring islands of Inishturk and Inishbofin. In this report a careful comparison is made between the flora of the three islands, and the leading points of difference between the island flora and that of the adjacent mainland are shown. The plant associations of Clare Island are described, and a vegetation map in red and blue is added. The latter part of the report is occupied with a full discussion of the problems of plant-dispersal, especially with reference to the flora of Clare Island. The writer argues the inefficiency of both water and wind dispersal, and gives the results of a series of experiments on the rate of fall of pappus-seeds and others specially adapted for wind-dispersal. Bird-dispersal he considers to be more important than either, but inadequate to account for the immigration of the bulk of the flora.

In Mr. Cotton's report on the Marine Algae, nearly half of the space is devoted to ecology. This is pioneer work so far as the British Isles are concerned, and is of great value. The various associations and societies, their distribution, character, and variation are described very fully, and the work of Mr. Cotton in the Clare Island district places that area on the same footing as the papers of Kjellmann, Kylin, Rosenvinge, Børgesen, Joubin, and others have done for Scandinavia, Greenland, the Faeröes, and Roscoff. The systematic part of the report is singularly complete, Mr. Cotton's list of species actually approaching to within fifteen species of the previous list for the whole of Ireland. The critical notes appended to the list of species clear up doubtful points regarding many of the plants dealt with.

Another remarkably extensive list is that of the Fungi, by Rea and Hawley, including as it does over 800 species from a district most of which is devoid of trees, and greatly exposed. The special attention given to critical and to minute species has resulted in the addition of nearly three hundred species to the Irish list.

Mr. West's report on the Fresh-water Algae (to which Marine Diatoms are added) represents a vast amount of work, and adds over 150 species to the Irish flora in this group, the knowledge of which in this country is largely due to his own work and that of his son, Professor G. S. West. The reports on the Musci, Hepaticae, and Lichens all add materially to our knowledge of these groups in Ireland, especially as regards the west coast. The addition of seven Hepaticae to the Irish list is a notable achievement, when we remember how thoroughly this class, like the Mosses, has been worked in Ireland.

The high total of the flora of the district, and the fact that 585 species are added to the Irish list, of which 55 are now for the first time recorded from the British Isles, and of which 11 (and a number of varieties in addition) are new to science, shows the remarkable effect of intensive study of a defined area, even when, as in the present case, that area is not particularly favourably situated as regards climatic or edaphic conditions.

The six reports together form, as shown above, a volume of 410 pages and 20 plates.¹ The plates are concerned mainly with the illustration of new or rare species, and of types of vegetation.

REVIEWS.

BRITISH AND IRISH BIRDS.

The British Bird-Book. Edited by F. B. KIRKMAN, B.A., Oxon. Parts ix. and x. London and Edinburgh: T. C. and E. C. Jack.

The British-Bird Book continues with each succeeding part to justify the claim of its preface that it would aim at bringing together "from every source, foreign and native, all the available information of any importance concerning the habits of British Birds." The accounts given in Part ix. of the Sanderling and Ruff, and in Part x. of the Golden Eagle, have only to be read to convince the most sceptical² that there was a genuine need for a new ornithological work making this its principal object. None of these three chapters—contributed respectively³ by Messrs.

¹ *Proc. R. I. Acad.*, vol. xxxi. pts. 10-16.

W. Farren, F. C. R. Jourdain, and W. P. Pycraft—could have been written until within the past few years, during which our knowledge of the breeding-habits of the three species dealt with has been placed on an entirely new footing by the close attention paid to the first of them by Herr Manniche, in North-east Greenland, to the second by Mr. Edmund Selous in Holland, and to the third by Mr. H. B. Macpherson in the immediate vicinity of an eagle's eyrie in the heart of the Grampians. Of the other birds dealt with in these two parts—which cover, roughly, the Sandpipers and their allies, with the Orders Fulicariæ, Gallinæ, and Accipitres, and the Swans and Geese—it is unnecessary to say that there are many whose habits are still so imperfectly known as to afford little material for a work on the present plan. The account given of the White-tailed Eagle, for example, is most regrettably meagre; and this is probably not the fault of Mr. Pycraft, who admits the special interest that ought to attach to the study of that splendid bird, representing as it does not only a distinct genus, but a distinct group, “only very remotely related to the true Eagles,” and actually included by Dr. Suschkin among the *Milvinae*.

On the subject of nuptial plumage, nuptial displays, and the battles fought between males in the breeding season, it is sometimes open to doubt whether a sufficiently clear perspective has been maintained by the different contributors. In treating of the Geese, Mr. Pycraft gives us a good example of the loose language that is so common in regard to these topics. Writing of the Greylag, he tells us that “the competition for females among the bachelors occasions some great fights”; and he adds that “the younger, unmated, ineligible birds live in the vicinity of the breeding colony, but keep in separate flocks.” But he does not state—as one would expect him to do if such were the case—that there is any ascertained disparity in the numbers of the sexes, or that the “unmated, ineligible birds” that live in separate flocks in or about the colony are all males. What is there, then, to prevent the defeated bachelors from finding mates when all the fighting is over? The natural conclusion, it seems to us, is that the original fights were for possession of ground rather than exclusively “for females.” This seems also to be the true conclusion deducible from the exhaustive and invaluable observations made by Mr. Edmund Selous on the breeding habits of the Ruff in Holland. As Mr. Jourdain (summarizing though not quoting the statements of Mr. Selous) puts it:—“The fully developed males had their own definite places on the hill, and the only real fighting seems to have arisen from a new comer pitching on a spot already appropriated.” The reviewer may here add that the conduct of two Ruffs and two Reeves which were kept in an enclosure in the Zoological Gardens in Dublin, last spring, was such as fully to bear out the conclusion that the stronger male bird indirectly secures preference from the females by winning and jealously holding possession of a favourite bit of ground, which no rival is permitted to enter.

The beauty of the coloured plates in these as in the preceding parts, is so great as almost to rouse in us a feeling of resentment on behalf of the few species which have been excluded from the favour of portraiture—amongst these being the White-tailed Eagle, a species surely not undeserving

of a picture. It would be impossible to overpraise Mr. Seaby's fine representation of a Curlew chasing a Raven from its breeding ground; and the same may be said of the plates showing the Common Buzzard (also by Mr. Seaby), the Golden Eagle, Hen Harrier, and Greenland Falcon, by Mr. G. E. Lodge, and "two Ruffs displaying to a Reeve" by Mr. H. Grönöold.

In the chapter on the Grouse sub-family, Mr. Jourdain, by an obvious slip, states that the Capercaillie was exterminated in Scotland and Ireland "during the second half of the nineteenth century"—meaning, of course, the eighteenth.

C. B. M.

THE WEST BRITISH FAUNA.

Wild Life in the West Highlands. By CHARLES HENRY ALSTON, with Illustrations by A. Scott Rankin. Glasgow: James Maclehose and Sons. 5s. net.

The subjects of which Mr. Alston treats are rather miscellaneous, but most of his chapters deal more or less with some phases of the natural history of the Western Highlands—an area with which, for reasons of proximity, Irish naturalists may well feel a special interest. Mr. Alston's chapters, however, do not supply much original information. A good many of them deal with rare and vanishing or even vanished British animals, as the Wolf, Beaver, Wild Cat, and Sea-Eagle, of which the author makes no claim to speak from first-hand knowledge. He has summarised with tolerable accuracy a good deal of the information furnished by previous writers regarding these species. His chapter on the Wild Cat might have been improved—since reference is made in it to that animal's absence from Ireland—had he been aware when writing it of Dr. Scharff's comparatively recent discoveries regarding a supposed old Irish Wild Cat, allied to the present African form. A few other references to Ireland occur in the course of Mr. Alston's book. His statement that the Water Shrew does not occur in this island might, we fear, be taken by some of his readers as implying that the Common Shrew does, which, of course, is not the case. There are some pleasing photographs and a good coloured plate of the Wild Cat—though a somewhat inferior representation of the Otter has been chosen for frontispiece to the volume. Bats, reptiles, and amphibia are ignored by Mr. Alston, but his interest in the *Salmonidae* has inspired three chapters which a good many of his readers will probably deem the best in his book.

C. B. M.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a young Otter from Mr. R. J. Ussher, a Kestrel from Miss Johnston, an Alexandrine Parakeet from Mrs. Forbes, and two Hybrid Ducks from Col. Claude Cane. Five Lion-cubs—three males and two females—were born on January 30th, the parents being "Red Hugh" and "Nigeria." A white-collared Mangabey and a Ferret have been received on deposit, and a young female Chimpanzee has been bought.

JANUARY 30.—The Annual Meeting was held (by permission) in the Lecture Theatre of the Royal Dublin Society. The President (Sir CHARLES BALL, Bart.), in the chair.

The Hon. Secretary (Professor G. H. CARPENTER) submitted the Report and moved its adoption.

The attendance of members and visitors during 1912 numbered 185,265, as compared with 199,856 in 1911, and the receipts at gate were £2,344 as compared with £2,393 in the preceding year. Entrance fees and subscriptions from new members amounted to £784 in 1912, as compared with £812 in 1911; this decrease is accounted for by the election of only twelve life-members in 1912, while fifteen joined in 1911.

The Honorary Officers have worked unchanged through the year. Both the Secretary and Treasurer are indebted to Professor J. A. Scott, who kindly undertook, at different times, both offices during vacation absences. Sir Frederick Moore has given much time in advising and superintending improvements in the grounds. Professor Mettam continues to act as the Society's Honorary Prosecutor, and to furnish valuable reports on the causes of death of animals in the Gardens. Early in the year it was found that Mr. J. Nugent Lentaigne had completed more than twenty years' service on the Council; his colleagues experienced great pleasure in electing him to an Honorary Vice-Presidency. The resulting vacancy, among ordinary Members of the Council was filled by the co-option of Mr. James Inglis.

Dr. B. B. Ferrar, the new Superintendent, has now completed a year in office, and has worked most zealously for the improvement of the Gardens and the comfort of the animals. During his vacation he visited the Gardens in Regent's Park, London, and several of the great Continental menageries.

In the Report for 1911, reference was made to the Fish Hatchery just commenced. Its completion can now be recorded, and several thousands of eggs of Salmon and Trout, given by the Fisheries Office, are undergoing development in its tanks. Many unforeseen difficulties arose in connection with details of the building, its water-supply, and equipment, but it is hoped that these have all been satisfactorily overcome, and that hundreds of young fishes will be on view in the ponds during the coming spring. The Council's hearty thanks are due to the Irish Fisheries Office, and to the Conservators and Riparian Owners of the Liffey, for the support which they have accorded to this undertaking.

The other building scheme foreshadowed—the enlargement of the Haughton House—was commenced during the year, and considerable progress has already been made. Plans were submitted in the spring by Messrs. Bachelor and Hicks, the most important feature of which was a considerable addition to the Members' Room, and an extension of the balcony outside it. A valued Member of the Council—one who had, indeed, initiated the provision of a Members' Room in the Haughton House—generously gave the sum of £250 to ensure an increased accommodation for the increasingly large number of Members and their friends who now make use of the room. With the greater facilities which will thus be afforded for garden-parties and other entertainments, which Members have the privilege of giving in the Haughton House, it is hoped that the Society may add largely to its list of supporters.

Besides the enlargement of the Members' Room, the alterations in progress at the Haughton House include a considerable addition to the size of the kitchen, the addition of a much-needed ladies' cloakroom, the extension of the balcony area available for the general public through a change in the position of the staircase, the provision of three or four new out-door cages on the western aspect of the House, and a large additional covered area, available for school parties, beneath the extended floor of the Members' Room and kitchen.

Several further schemes for the improvement of the collections have been considered by the Council. The Bears need badly an enlarged set of dens and open rockwork ; some open-air cages would be a most desirable addition to the Monkey House ; a building is needed for the small Carnivora ; several members are eager to provide a modern aquarium. It is hoped that one or two of these improvements may be carried out during the next twelve months. In these, as in other matters, the power of the Council is dependant on the support of the public.

In each Annual Report it is, unfortunately, necessary to chronicle the loss of valuable specimens by death, and the year 1912 brought some sad gaps in the collection. The Orang, "Bella," which had seemed well acclimatised during the summer of 1911, contracted tubercular disease during the winter, and died in April. The White-handed Gibbon which was in the Ape House a year ago, also died, and so did another of the same species, as well as a Hoolock, kindly brought during the year from Burma, and given to the Society by Dr. J. M. Falkiner. Another Hoolock from the same generous donor is, however, still healthy and lively, although he arrived in a very weak condition. The Chimpanzee, "James," having lived for two years in the Ape House, died during the summer, and a small female, "Sally," given by Lieutenant Phillips, never seemed at home, and survived only till December. In the latter month the Society had the good fortune to receive on deposit a splendid male Chimpanzee, "Tom," the property of the Hon. Walter Rothschild. The animal is nine years old, and has lived for five years in the London Ape House ; its owner has now most kindly allowed its transfer to Dublin. "Tom" is so large and strong that the Anthropoid cages with their wire-netting and plaster walls were deemed unsafe for his habitation ; three of the ordinary cages in the Monkey House were therefore thrown together

and strengthened for his reception. He is believed to be the largest Ape ever shown in Dublin.

Perhaps the most notable feature in the Monkey House at present is the collection of South American species, whose gymnastic feats—well aided by the prehensile tail—are a great attraction to visitors. Four female Black-faced Spider-monkeys disport themselves in the large central cage, while two species of Capuchins—the White-fronted and the Brown—are represented by three and five specimens, respectively.

Very serious loss has been sustained in the grand collection of Lions through the deaths of "Jerry"—given years ago by Lord Cranworth; of "Sultan," the noble wild male given in 1911 by H.M. the King; and of "Vesta," one of the breeding Lionesses, which had lived since her birth in 1903 continuously in the open-air den. The deaths of "Jerry" and "Sultan" were due to intestinal stoppage, altogether irremediable by any possible care of the keeper. As some compensation for these losses, a pair of well-grown young Lions from East Africa were kindly given by Mr. H. Gurney Barclay. Of these, the female, "Mitze," has been mated with "Conn" in place of the dead "Vesta." A litter of four fine cubs, two of either sex, were born in September, "Red Hugh" and "Maive" being the parents. The "Niger-Nigeria" family born in 1911 were sold, together with their sister, "Sheila." The stock now stands at nine males and eight females.

The Pumas continue to flourish in their open-air cages; another cub was born in August, and a new male has been given by the Earl of Lonsdale. The pair of Dingos have brought up a family of six puppies. A very valuable gift received during 1912 is the Indian Wild Dog given by Mr. W. E. J. Dobbs. The Duke of Orleans presented a large old Russian Brown Bear, and a younger member of the same species was received in exchange. A group of five Racoons have been given by the Rt. Hon. Jonathan Hogg.

After prolonged consideration, the Council decided that an Elephant must be obtained for the collection, and a very healthy and good-tempered young female, "Roma" by name, was bought from Messrs. Hagenbeck for £250, the sum spent on her purchase representing half of the whole year's expenditure on new animals. "Roma" arrived in charge of an Indian keeper, who, after staying a fortnight, handed over his pet to the Society's Elephant-keeper. Among Ungulata the Society has to regret the loss of several valuable specimens, including the Wapiti Stag, the Maxwell's Duiker, and the Wart Hog. On account of the difficulties raised by the prevalence of cattle-disease, no attempt has been made to replenish the stock in this order of beasts. The Black-tailed Wallabys in the Haughton House continue to breed freely; two young were born in the summer. A Virginian Opossum, not represented in the Gardens for some time past, has been purchased. Among the Birds, a Burmese Hawk-Eagle from D. J. M. Falkiner, and a Sharpe's Wood Owl (West Africa) are especially noteworthy gifts. Dr. W. S. Bruce, of Edinburgh, deposited three Spitsbergen Ptarmigan in the Gardens, but it was possible to keep them alive only for a few weeks. An exceptionally large West African Python, measuring 18 feet in length and weighing 130 lbs., was

given by Mr. C. E. Lane Pool, but it did not live in the Monkey-house (where alone it could be fairly well accommodated) more than a few days. If the new Aquarium be built, the Council hope to modify the present Aquarium into a properly-heated Reptile-house.

The Photographic Competition of 1912 was distinguished by the receipt of more entries than usual, and by the production of some remarkably fine pictures. The Silver Medal was won by Mr. S. Allsop, of Walsall, and a special Bronze Medal in the same class was awarded to Mr. J. McGrath, Dublin. The Bronze Medal offered to competitors under eighteen years was awarded to Miss Annie M. Goodman, Dublin.

Among the gatherings of various societies in the Gardens, the visit of the Museums' Association, entertained to tea by the Dublin Local Committee on the occasion of their annual meeting in July, brought several distinguished zoologists to see the collections. It is gratifying to the Council to learn that a picture of young Pumas, painted by the Edinburgh artist, Mr. William Walls, R.S.A., from models living in the Dublin Gardens has been bought by the National Gallery of Scotland. Mr. Walls has now most generously lent to the Society his painting of a Lioness, for which "Nigeria" served as model.

In connection with the inauguration of the Fish Hatchery, the Council invited Mr. W. S. Green, C.B., Chief Inspector of Fisheries, to give the usual popular lecture in the theatre of the Royal Dublin Society, most kindly lent for the occasion. Mr. Green's lecture, delivered to a large audience on December 12th, dealt with "Irish Fisheries." The Council feel much indebted to Mr. Green for this valuable help.

The Council wish also to place on record their thanks to the Distress Committee of the Dublin Corporation, for allotting men during the early months of the year to work in the Gardens. Also they would express their gratitude to Messrs. Palgrave, Murphy and Co., for having carried "Roma," the new Elephant and her keeper, free of freight and fare from Hamburg to Dublin. This is by no means the first occasion on which Messrs. Palgrave, Murphy and Co., have thus helped the Society, on whom the very heavy transport charges, often incurred, lay a serious burden. The Dublin newspapers have, as always, done much to arouse and maintain public interest in the Zoological Gardens and the creatures which find a home therein.

The Hon. Treasurer (Dr. E. MACDOWEL COSGRAVE) in seconding the adoption of the Report, submitted the Statement of Accounts for 1912. The year began with £914 on deposit, and an overdrawn current account of £80, and closed with £717 on deposit and an overdraft of £111. The chief items of expenditure were £1,243 for food, £505 for purchase of animals, £1,136 for buildings, £1,203 for salaries and wages. £397 was received from the sale of animals. The Report and Accounts were unanimously adopted.

Sir FREDERICK MOORE proposed some alterations in the rules allowing the Council to co-opt representatives of public bodies contributing to the Society's funds; extending the privilege of free admission to the families and domestic servants of members; and granting to members on application, if resident more than 20 miles from Dublin, a yearly book of

twenty tickets. These changes were seconded by Mr. Longworth Dames and passed.

Messrs. F. Gifford, J. Inglis, and Dr. Woods were elected to vacancies on the Council.

Professor J. A. Scott gave an account of changes in the gardens during 1912, illustrated with a lantern and cinematograph display.

BELFAST NATURALISTS' FIELD CLUB.

NOVEMBER 11.—The President (Rev. Canon Lett) delivered an address on "Botanists of the North of Ireland," which has already appeared in the *Irish Naturalist* (*supra* pp. 26-33.)

FEBRUARY 5.—Before the Botanical and Zoological Sections, R. LLOYD PRAEGER, M.R.I.A., gave a lecture entitled, "What do we mean by a Native Species?" Robert Welch occupied the chair. In the course of his address, after pointing out the general character of the European flora, and tracing the progress of human interference with the pre-existing vegetation, and the various classifications of native and non-native plants which had been proposed, Mr. Praeger said the definition of a native species employed by Dunn in his "Alien Flora of Britain" requires us to ask three questions relating to the species under consideration. First, have the ancestors of it been in the district since prehistoric times; secondly, did it reach its present habitat without the aid (either intentional or accidental) of man; thirdly, is it living on ground which has been undisturbed by man? If we can answer these three questions in the affirmative we may, according to Mr. Praeger's formula, regard the standing of the species as NNN in whatever area we may be considering. On the other hand, the standing of an alien plant brought from a corn-field, into which it was transported with seed by man, and planted in cultivated ground is regarded as ***. Between these two extremes we have six combinations of N and *. Thus the standing of an animal which has spread from a lake such as Lough Neagh into an artificial waterway, such as the Lagan Canal, changes from NNN in the lake to NN* in the canal. And, again, one brought by man from Lough Neagh, where it was NNN, and placed in an artificial pond becomes N**. An alien which in a garden would be *** becomes similarly *NN if it spreads by its own powers to undisturbed ground, or it becomes *N* if it spreads to cultivated ground, or it becomes **N if it is carried by man and deposited in natural or undisturbed ground. In conclusion, Mr. Praeger suggested that only those animals and plants whose standing in any district can be regarded as NNN or NN* may be considered for general purposes to be "native."

The Chairman having thrown the meeting open to discussion, many points arising from the lecture were raised by members, including Professor Gwynne-Vaughan, Dr. Dwerryhouse, A. S. Bennett, A. W. Stelfox, and others, and replied to by Mr. Praeger.

DUBLIN MICROSCOPICAL CLUB.

JANUARY 8.—The Club met at Leinster House, D. MCARDLE, (Vice-President in the Chair)

N. COLGAN exhibited the radula or lingual ribbon taken from one of two specimens of *Doris proxima*, Alder and Hancock, which had been dredged at Malahide, Co. Dublin, by Professor Bayley Butler on the 10th December last. This species is superficially so similar to *D. aspera* of the same authors, that it is hardly possible to distinguish them without comparison of the radulae. But an examination of this organ shows a radical difference of structure which at once separates the two species and has induced Bergh to adopt *D. proxima* as the type of a new genus, *Adalaria*, intermediate between the genera *Acanthodoris* and *Lamellidoris*. While the lingual formula of *Adalaria proxima* is 10-I. 1. I-10. in *D. aspera* it is 2-I. 1. I-2. There appears to be no previous record of *A. proxima* for Irish waters, so that Professor Bayley Butler may be congratulated on the addition to our marine fauna of a new species of nudibranch. It is not improbable that the species will before long be discovered in other Irish stations.

PROF. G. H. CARPENTER showed specimens of a blind springtail—apparently a new species of *Cyphoderus*—recently collected by Dr. Nelson Annandale (superintendent of the Indian Museum, Calcutta), on the borders of the Lake of Galilee, close to the town of Tiberias. The insect which will probably be described and figured in the *Journal* of the Royal Asiatic Society of Bengal, is nearly related to species of *Cyphoderus* from the valley of the Nile. A corresponding affinity between the fishes of the Jordan and Nile valleys has long been known.

W. F. GUNN showed the adult form of *Corethra plumicornis*, a dipterous fly, well known for the beautiful plumose antennae which it possesses, and which in the larval form is known as the "phantom" or "glass" larva. This object was chosen for exhibition principally to demonstrate a method of illumination which seems advantageous when a low power is used on certain objects which provide sufficient contrast. Underneath the stage and resting upon the substage of the microscope a piece of roughly ground pure white opal glass is placed, and a strong beam of light is focused on it by means of a bull's-eye condenser, or other suitable optical arrangement. This gives a pure white background on which the object stands out with great clearness. As the rays of light are broken up and diffused by the rough surface of the glass, there is an entire absence of reflection from one part of the object to another which results in a corresponding distinctness and sharpness of the image.

Professor Carpenter remarked that a somewhat similar result is obtained in many dissecting microscopes by the use of an opaque white paper disc in place of the usual reflecting mirror.

D. MCARDLE showed dissected capsules of *Tetraphis pellucida* from specimens recently collected in the Co. Wicklow, disclosing the spores and showing the possible origin of the peristome, composed of four solid conical teeth, derived from the fission of the whole cellular tissue of the

interior of the lid. These solid undifferentiated teeth of the peristome appear to mark a very primitive stage in that organ, which is so highly developed, and so characteristic in other mosses. There is also a peculiar feature in the protonema which develops curious "frondiform" leaves; these disappear before the young stems are developed, and are therefore often overlooked. In these peculiarities, *Tetraphis* is not approached by any other mosses, excepting the exotic genus *Calomnium*.

NOTES.

GEOLOGY.

Beekite.

In the *Report and Proceedings of the Belfast Naturalists' Field Club* for 1911-12, recently published, Mr. James Strachan has an important illustrated paper on beekite, or cycloidal chalcedony.

ZOOLOGY.

Insects on the Great Blasket and in West Kerry.

In the *Irish Naturalist* of October, 1912, Mr. A. W. Stelfox records the land and freshwater mollusca found during his visit to the Blaskets in the preceding June in company with Mr. Praeger. A few beetles were collected on Great Blasket on this occasion; although they are common insects they are worth recording from so isolated a locality:—*Cicindela campestris*, *Cyclonotum orbiculare*, *Phyllopertha horticola*, *Athous haemorrhoidalis*, *Byrrhus pilula*, and *Barynotus Schönherr*.

Mr. Stelfox remarks that although no natural habitats with permanent water appear to exist on the island, yet two species of water-beetles were collected there; these were identified by Mr. Balfour Browne. The first, *Helophorus viridicollis*, Steph., occurred under clumps of sphagnum in damp places on the summit between the Signal Tower and Slievedonagh. The second, *Anacaena globulus* Payk., was found on the cliffs at Foilbeg.

A single example of the common earwig, *Forficula auricularia*, with rather long forceps (7 mm.) was also collected on Great Blasket.

On the mainland at Cloghane the uncommon black variety of *Carabus granulatus* (var. *interstitialis* Duft.) was taken. It would appear to be of rather frequent occurrence in the south-west of Ireland. Also, the wing-cases of *Carabus clathratus*, and two fine examples of *Carabus glabratus* on the high pass at Connor Hill.

J. N. HALBERT.

Woodcock Carrying Young.

While walking through a wood near Old Conna, in the Co. Dublin, on the 8th May, 1909, I flushed a Woodcock which flew into a gorse bush about 20 yards off. Immediately afterwards I saw three young Woodcocks, about as big as Robins, on the ground where the old bird had been. Almost at once she flew back, picked up one young one and carried it about 15 yards to a gorse bush, into which she disappeared. The two other young birds ran away, and took refuge in another bush. I remained on the ground for some time, but saw no more of the birds. As far as I could see, the old bird carried the young one close to her body, her legs and feet being placed under the little bird as a support, in fact "she clasped it to her bosom." As there is a good deal of controversy as to how Woodcocks carry their young, I have been asked to send this account to the *Irish Naturalist*.

GEORGE C. MAY.

Dublin.

Whooper Swans in County Down.

I witnessed the arrival of five Whooper Swans, *Cygnus musicus*, on a lake here during the afternoon of 1st December, 1912. They were immediately mobbed by the resident Mute Swans, *C. olor*, and chased about the lake, about half of which on this day was covered with ice. After dark I still heard the calls of these Swans on the lake, but next day the birds had departed. This is the same lake referred to in Thompson's "Natural History of Ireland" (vol. iii., p. 20) where four "Wild Swans" remained for three weeks in 1845.

NEVIN H. FOSTER.

Hillsborough, Co. Down.

Grey-lag Goose in Wexford.

On the 11th December, 1912, I was in Wexford town, and saw three or four Grey-lag Geese hanging up in the shops. I have never seen this species in Wexford before, the bird usually shot being the White-fronted. Wild Geese seem to be increasing in numbers in this county. We used to have them only in hard winters, but now some of them are here every year.

G. E. H. BARRETT-HAMILTON.

Kilmanock, Co. Wexford.

Daubenton's Bat in County Waterford.

It may be well to place on record that there is a colony of these bats at Cappagh, Co. Waterford. Mr. R. J. Ussher very kindly sent me a specimen some time ago, and I think he has also sent some to the National Museum, Dublin.

G. E. H. BARRETT-HAMILTON.

Kilmanock, Co. Wexford.

BOTANY.**Wheat Experiments at the Albert Farm, Glasnevin, Dublin.**

In order to test the yielding capacities and quality of several French and certain other varieties of wheat, the Department of Agriculture carried out a series of field tests at the Albert Agricultural College Farm, Glasnevin, in 1911. The results of these tests were published in the Department's Annual Report on Wheat Experiments for that season. The tests have been repeated this year, and the list has been supplemented by four other varieties. Three of these were Danish wheats imported by the Department from Copenhagen, and one a variety grown to some extent as a spring wheat in Counties Carlow and Kildare.

The yields for 1912 are, with one exception, considerably below those for 1911. The average yield of wheat on the farm for a number of years past has been about 12 barrels per statute acre. All the French wheats show a large decrease, and the only increased yield for the whole series is that of "Red Fife," the seed of which was obtained from the produce of some hand-selected ears grown by the Department in 1910.

The three Danish varieties, "Queen Wilhelmina," "Tystofte Small Wheat," and "Danish Square Head," gave very good yields. In point of quality "Red Fife" was undoubtedly the best wheat of the series, next in order coming "Burgoyne's Fife." "Queen Wilhelmina," a white wheat, may be placed next, and then, a long way behind, "White Marvel."

"Tystofte Small Wheat" and "Danish Square Head" are varieties of the Square Head Master type, but not so coarse. The French varieties, with the exception of "White Marvel," are very poor quality, "Dreadnought" and "Perfection" being wholly unsuited for milling requirements. The partial failure of "Perfection" this year was in large measure due to bad germination of the seed. "April Red," a variety resembling "Red Fife" in shape of ear, excepting that it has a distinct awn, is a late spring wheat. In yield it does not equal "Red Fife," to which variety it is also inferior in quality.

Regarding the two new hybrid wheats, "Little Joss" and "Burgoyne's Fife," while the former is undoubtedly the heavier yield, in quality it is greatly inferior to "Burgoyne's Fife." Other things, such as quality of straw, being equal, there is nothing to recommend "Little Joss" in preference to "Tystofte Small Wheat," a variety which by reason of its productivity and generally acceptable quality is grown extensively in Denmark.

Of all the varieties tested, "Queen Wilhelmina," on account of its yielding capacity and quality, appears at present to be the most desirable wheat, and certainly merits the attention of Irish wheat growers.

***Polygala vulgaris* var. *grandiflora*.**

To the *Journal of Botany* for July, 1912, Mr. A. Bennett contributes a note, in the course of which he points out that the correct name of the famous Ben Bulbin *Polygala* should be *P. vulgaris* L. var. *Ballii* (Nyman).

BEES AND FLOWERS.

BY C. B. MOFFAT, B.A., M.R.I.A.

(Read before the Dublin Naturalists' Field Club, 11th February, 1913.)

I was standing one day by a large bed of Wall-flowers, at which great numbers of the Honey-Bee were busy extracting honey. The Wall-flowers were of three colours—the three old-fashioned varieties with which everyone is most familiar: that is to say, the bright orange-yellow, the deep mahogany brown, and the mixture of the two tints, brown streakings on yellow ground. Watching the bees, I was struck with the fact that every one of them was most particular in sticking to Wall-flowers of one colour, and neglecting both the other colours. A horticulturist who wanted to keep his varieties pure might have trusted the whole swarm of bees on that bed. There were crowds of bees at every colour—no preference whatever was shown for yellow or streaked or brown. But no bee that was working at brown left it for yellow or streaked; no bee that was working at yellow took the slightest notice of streaked or brown; and no bee that was working at the streaked transgressed for a moment either to the uniformly brown or the uniformly yellow.

Of course, I would have been surprised to see a bee—especially a Honey-Bee—fly from a Wall-flower to a flower of a different kind, or from a flower of a different kind to a Wall-flower. That would be a violation of the well-known bee-rule against mixing either the honey or the pollen of two different species of plant. The rule that a bee should confine itself to one kind of plant during a journey is followed—though not with the same degree of strictness—by every kind of bee with which I have any acquaintance; and of course it must have had enormously beneficial results for the plants in securing the fertilisation of each flower with pollen of its own species. Not only bees but many other insects, and particularly the hawk-moths, follow the same rule, and so become important agents in

fertilisation. But that is a very different thing from sticking to one variety like the brown or streaked Wall-flower : in other words, letting distinctions of colour stand in their way, when a flower shows all the other features of the one they are looking for.

On the other hand, I am sorry to say that bumble-bees sometimes show a lack of botanical ability which would rather shock a good many members of the Field Club. I was standing one day in a bit of waste ground, where two very common plants, the Hedge Woundwort (*Stachys sylvatica*) and the Marsh Woundwort (*Stachys palustris*) were growing together, both in great profusion. A bumble-bee arrived, of the species *Bombus hortorum* (one of the black and yellow kinds) which evidently had been gathering from Marsh Woundwort in an adjoining field, where that species grew by itself. But when this bee got among the mixed lot of plants on the waste ground, its perplexity between the two species became really quite comical. On its first meeting with the Hedge Woundwort it darted off again, as if seeing that there was something wrong. Not satisfied, it returned, again darted off, then tried another flower, which was also Hedge Woundwort, finally gathered a little, and then appeared puzzled again when it got back to Marsh. In fact, after wasting a good deal of time with its various hesitations, this bee totally gave up the attempt to distinguish between *Stachys sylvatica* and *Stachys palustris*, and proceeded to gather with the utmost impartiality from both. Moreover, this was not a case of individual stupidity, for a few minutes later a second bee of the same species (*Bombus hortorum*) arrived, and showed the same failure to discriminate between these two allied plants. Now, to our eyes the Hedge and Marsh Woundworts show no more than a very ordinary family likeness. Even if we confine ourselves to the features that a bee might be expected to attend to, the colour of the corolla is much deeper purple in the Hedge than in the Marsh, the scent—if we can call it such—is far stronger and nastier in Hedge Woundwort, and that plant has also flowers with deeper tubes—a matter of so much importance to the bees that

according to Müller one of our bumble-bees (the common *Bombus terrestris*) is unable, with its short proboscis, to get at the nectar of *Stachys sylvatica* at all, though it gathers freely from *S. palustris*. Taking all these differences into consideration, it appears to me very singular that bees should show themselves quite unable to distinguish between the two Woundworts, although they certainly show when they first pass from one to the other a suspicion in their minds that there is something wrong.

It may be asked, why should a bee distinguish one kind of flower from another, if both kinds contain good honey? I confess that, except for the benefit of the plants, I don't see why it should. The fact remains that in ordinary cases it is what the bees do.

I think I remarked at a former meeting of this Club, *à propos* of the Clare Island flora, that a solitary seed borne across the sea to an island where its species was previously unknown, even if it had the not-very-likely good fortune to find room for development and become a flowering plant, would still have very little chance of becoming a parent of other seedlings if it depended for that purpose—as so many plants do—on the visits of insects. I did not mean merely (as I think some members understood me to do) that no pollen from another plant of its kind could be carried to it; for that is not always necessary to effect fertilisation when a number of flowers occur on the same plant. I meant that no insect of the right kind would go to it at all, unless the plant from which it had last been gathering was of the same species, which *ex hypothesi* it could not have been. I may be asked whether the rule of regularity is sufficiently adhered to to have this practical effect, and I admit that departures from it occur. The case of the Woundworts was an instance, and plenty more might be given. But that the effect I have claimed does follow in nature—I think I can illustrate by an observation I made (in July, 1904) on some flowers of our commonest Orchis, *O. maculata*. One can tell by pulling an Orchis flower open whether it has been visited by a fertilising insect or not, for if it has the insect will have carried away

one at least—possibly both—of the pollen masses or pollinia, adhering to its proboscis or to its face. I went to a small bog where *Orchis maculata* was growing in very great abundance—so abundantly that it would certainly have taken an enormous multitude of insect visitors to fertilise all the flowers. I gathered here one spike, and examined all its open flowers—nineteen in number. In only one of the nineteen flowers—the uppermost and therefore the most recently opened—I found both the pollinia still present. In three others one pollinium was left while one had been removed. In all the remaining fifteen both pollinia had been carried away. I then went to a field that was not so well adapted for bog-loving plants, where a single spike of *Orchis maculata* was growing by itself. I opened its flowers, beginning with the lowest and therefore longest expanded, and I found in every flower both pollinia still in their places. No bee or other useful insect had been to that *Orchis*, though hundreds and hundreds of such insects must have been at work at flowers of its kind in a bog not half a mile away. That was isolation on a very small scale. What would be its chance of fertilisation if that plant of *Orchis maculata* had been growing on an island separated by miles of sea from the nearest ground where another plant of its kind occurred?

But I now come to a strange case of an apparent departure from rule, which has been a subject of special interest to me for the past eighteen years. On June 3rd, 1895, walking through a wood in County Wexford, I noticed a specimen of the Common Carder Bee (*Bombus muscorum*, as we used to call it, though I am told I must now, to my great regret, call it *Bombus agrorum*) gathering honey from a flower of that pretty Vetchling, *Lathyrus macrorrhizus*, or the Heath Pea. I watched it, and found that after imbibing nectar from two or three plants of Vetchling it suddenly descended on a flower spike of the blue Bugle (*Ajuga reptans*), but after gathering from that it went again to *Lathyrus*. So long as I watched that bee it moved about dividing its attention between those two plants, but touching no others. About half an hour after-

wards, in a field some distance away, I saw another bee of the same species, also gathering from *Lathyrus macrorrhizus*, and it was also dividing its attention between that plant and *Ajuga reptans*. And in the course of the same walk I came on a third specimen—*Bombus agrorum* again—gathering in about equal proportions from Vetchling and Bugle, and restricting itself with the same precision as the others to those two plants alone.

Now, of course these three occurrences were not a mere accidental coincidence. It was evidently a habit of *Bombus agrorum*, for some reason, to mix the honey of *Lathyrus macrorrhizus* with that of *Ajuga reptans*. In fact, I have never since been in the country in early June without noticing some instances of this singular behaviour. I have seen no bee but the Carder Bee gathering at all from *Lathyrus macrorrhizus*; and I have never, since my attention was drawn to the matter in 1895, seen a bee gathering from *Lathyrus* which did not, on being watched, prove to be also visiting the flowers of *Ajuga reptans*.

The converse, however, is not so strictly true. I have seen bees of this species at the Bugle when there was no Vetchling for them to gather from. And as it is sometimes said the exception proves the rule, I will go on to say what happened on some of these occasions.

Firstly: an incident that greatly pleased me happened on June 3rd, 1901. I saw a *Bombus agrorum* gathering from Bugle, in a part of the woods where Bugle was flowering in extreme profusion (carpeting the ground, you might say) but not a bit of *Lathyrus macrorrhizus* was anywhere in sight. I watched that bee, and after gathering from two spikes of Bugle it got restless, flew to many other spikes without gathering, then went on a slow roving flight for perhaps 200 yards through the wood, till I saw it suddenly pounce on something low down among the herbage. I ran up, and there was the bee clasping in triumph a flower of *Lathyrus macrorrhizus*. And after a good draught had been taken from the flowers of that one plant, which it had so cleverly found, it went back to Bugle, gathered from two more spikes of that species, and once more flew away, for what purpose I can only guess.

But towards the middle of June the Vetchling goes out of blossom; and the Bugle remains, and after that I notice *Bombus agrorum* continues gathering from Bugle, but now it mixes the nectar of that plant with that of the Wild Raspberry (*Rubus Idaeus*), or else with that of the Dwarf Red-Rattle (*Pedicularis sylvatica*). There may be other mixtures adopted, but those are the two most favoured—always presuming the absence of *Lathyrus macrorrhizus*.

Now, a reason for this mixture (from the bee's point of view) presents itself in the fact that I have sometimes seen Carder Bees in a state of complete stupefaction on flowers of *Ajuga reptans*. Indeed, once (June 11th, 1907) I noticed as many as four stupefied specimens of *Bombus agrorum* on flowers of the Bugle within a space of six square yards. Evidently the nectar of that plant is a bit too strong for them, and needs to be diluted. As far as I can make out, the honey of the Heath Pea is never taken except to dilute that of the Bugle, so I suppose it is of a specially washy nature. If I am right on that point, *Lathyrus macrorrhizus* depends for its fertilization on having the Bugle for one of its neighbours. But of course its honey may be taken for other purposes, and by other insects, and I would like to invite further attention to the question.

I could not exhaust this subject without bringing in the peculiar conduct I noticed one day in a Bee Hawk-Moth (*Macroglossa bombyliiformis*) which I was watching as it was drinking honey from the flowers of *Pedicularis sylvatica*. I may say that the Bee Hawk-Moth is quite as particular as a bumble-bee in observing the rule that one sort of flower should be kept to at a time. This Bee Hawk-Moth, while I watched it, gathered from 250 flowers of the Dwarf Red-Rattle, and touched no other flower, though there were plenty of others about. But still I thought it behaved in a very erratic, not to say stupid, fashion. For during the course of those 250 visits to the pink flowers of the Red-Rattle, it turned aside no fewer than fifteen times on catching sight of clumps of blue Milkwort, which, of course, were

not the flowers it was looking for, and which it invariably left without gathering from them as soon as it saw what they were. But why in the world did it make so many as fifteen mistakes, all at the same flower, and that a blue one, when the flowers from which it was gathering were pink? Could the moth be colour-blind? No, it was not, for it passed many clumps of Milkwort that were pink without noticing them at all, and only tried at the blue ones. So it saw the difference between blue and pink in the Milkwort, and yet it made no confusion between pink Milkwort and pink Red-Rattle, but made, as I thought at the time, the far more unaccountable blunder of confusing blue Milkwort with pink Pedicularis.

That was on June 10th, 1897. On May 23rd in the following year I met with another specimen of the Bee Hawk-Moth whose conduct throws, I think, a little light on that of the insect which made so many abortive darts at the blue Milkwort. It was one of four Bee Hawk-Moths which I watched during that day, for there seemed to have been rather an outburst of them. Two were visiting exclusively the flowers of the Primrose, which they are well adapted for fertilising; the third was gathering exclusively from Red-Rattle—also a flower very specially adapted for fertilisation by insects with long probosces; and the fourth was also gathering from Red-Rattle, but turned aside, and this time not in vain, to gather (or rather drink) from a blue flower—and that blue flower was our friend *Ajuga reptans*.

The Bee Hawk-Moth, therefore, resembles the Carder Bee in liking the honey of *Ajuga reptans*, but apparently it further resembles it in not daring to take that honey except in a mixture with something else; and we find the curious further point of similarity that the honey of the Dwarf Red-Rattle is found by both insects a suitable antidote to the too narcotic though nice nectar of the Bugle. I think it is only fair to suggest that the Hawk-Moth which I thought so stupid the previous year in confusing blue Milkwort with pink Red-Rattle was really acting quite rationally in making all those plunges at the

blue Milkwort, because it was in hopes that the blue spikes might prove to be those of the blue Bugle.

But now, how can we justify this strange peculiarity of the Bugle blossom? It is a plant well-known to be "laid out" for cross-fertilization by long-tongued insects, like bumble-bees and hawk-moths. Does it want, then, to be cross-fertilised by them, or does it not? It produces honey that these useful insects like; but it compels them, after drinking a little, to go away to some other sort of flower, involving no doubt, considerable waste of pollen, or else, if they do not, it stupefies the insects, and puts a total stop to their day's work.

I can only offer one suggestion, and perhaps it may be thought extremely far-fetched, to explain this eccentric quality in the nectar of the Bugle. The Bugle has been well named *Ajuga reptans*. It spreads by creeping with astonishing vigour. One can judge of this sometimes in a wood by coming to a patch of ground carpeted by Bugle of some unusual colour—possibly white or perhaps pale lavender—showing how far a single off-coloured plant has extended itself by means of its creeping scions. So it would seem that a bee or hawk-moth which confined itself exclusively to Bugle might move about for a long time, and visit large numbers of flower-spikes, and yet be only gathering from the same plant, so that real cross-fertilization would not occur. But if the bee has to go off at frequent intervals to search for *Lathyrus macrorrhizus*, or some equally useful antidote, the chance is vastly increased that on its return to Bugle it will find itself in the neighbourhood of a new plant, so that if enough of the pollen still remains on it, there will be real cross-fertilisation, which, as Darwin has shown, is generally much better than fertilisation from flowers of the same plant.

If any member of the Field Club visits the Aran Islands¹ when *Ajuga pyramidalis* is in bloom there, he might help to

¹Mr. Praeger has kindly pointed out to me that parts of the Clare mainland would afford a more favourable field. I think the observations would best be made in a native habitat of the plant, where the insects visiting it would be acquainted with its properties.

clear up this point by ascertaining what bees or other long-tongued insects visit the flowers of that species, and whether they persevere in gathering from it exclusively, or go off at frequent intervals to take sips of something else. As *Ajuga pyramidalis* does not spread by creeping scions, it has not the motive I have suggested in the case of its cousin *A. reptans* for driving its most welcome visitors frequently away.

I hope I have now shown that bees act with more intelligence and more botanical knowledge than some writers of to-day give them credit for in their honey-gathering and pollen-gathering expeditions. An ingenious theory was started some years ago by Mr. E. Kay Robinson, that it was all a mistake to suppose that the colours or markings of flowers had any such purpose as to attract or to guide insect-visitors—that insects, in fact, do not mind them, and that such colours are really designed to warn off grazing or browsing animals from eating the flowers when they are feeding upon the leaves. I have not left myself time to discuss that theory as I would like; but briefly I would say, that I think the most primitive of all floral colours—namely, yellow—may very possibly have been evolved for some such purpose as Mr. Robinson thinks. Yellow was the easiest colour for a modified leaf to take, because it is simply the colour of a faded leaf; and as browsing animals mostly prefer fresh leaves to faded, one can fancy that the device of turning yellow prematurely might prove a great success in keeping primitive flowers from being eaten. But if that is the object of floral colours all round, yellow—the most primitive—is still the most successful colour on the face of the earth to-day. Both in individuals and in species yellow flowers far outnumber the rest; and there would, therefore, be more disadvantage than profit in advancing from a warning colour so universally well-known and successful to a high tint like blue, which, though representing the topmost rung of the ladder, appears to have been the least successful in the competition for space. On the other hand, for the purpose of guiding insects that want to stick to one sort of flower at a time, it is an advantage to every flower that wants such visitors

to differ in colour as much as it can from all its neighbours of different species. It does not want to be visited in mistake for them, nor does it want them to be visited in mistake for it. And bees, as I have shown, need such teaching; they make mistakes; they cannot distinguish *Stachys sylvatica* from *Stachys palustris*, and even the Honey-Bee, according to Müller, sees no difference between the flowers of our three common Buttercups:—*Ranunculus bulbosus*, *R. acris*, and *R. repens*. This makes the acute discrimination they do show in other cases the more significant; and its helpfulness to the plants is evidently a vital force in the story of their evolution. I do not suppose that the so-called highest colour in the evolutionary scale is any better than those beneath it; the advantage seems to lie merely in having as many different colours as possible by way of aids to discrimination. For my part, I think the beginning of all colour evolution in flowers was premature fading; that before there were yellow flowers yellow appeared in faded leaves, as it does to-day; that before there were white flowers some yellow flowers turned white in fading, as the Lesser Celandine does to-day; that before there were pink flowers some white flowers faded pink, as the Hawthorn does to-day; and that before there were blue flowers some pink or crimson flowers faded blue, or nearly blue, as the Heath Pea does to-day. That prepared the way for possible development by favour of insects; but how they came to favour the seemingly faded in preference to the seemingly fresh is a question in prehistoric economy which I have no present intention of attempting to solve. I think further study of insects in the field may some day give us the clue.

Dublin.

LEPIDOPTERA AND COLEOPTERA FROM
CO. KERRY.

BY L. H. BONAPARTE WYSE.

Among my entomological captures from Kerry last summer, chiefly from the neighbourhood of Killarney, the following are perhaps worth mentioning.

LEPIDOPTERA.

Epinephele janira, L. var.—I took on July 16th at the foot of Manger-ton, a female example, which has two black spots below the large apical eye-spot on the fore-wing. These spots are also reproduced on the under side. I took a second very similar example, also a female, at Glenbeigh, on August 1st. Kane, in his "Catalogue of the Lepidoptera of Ireland," p. 12, mentions a form which agrees very closely with this: "The Rev. James Bristow has a specimen with a small ocellus towards the anal angle, and a minute one between it and the apical. This aberration is evidently a reversion to the general design of the Satyridae, and thus is very interesting."

Acronycta euphorbiae var. **montivaga**, Gn.—A large dark female example which I took on the wall of the Caragh Lake Hotel, seems to be identical with this alpine form. Rare in Ireland.

***Hydroecia crinanensis**, Burrows.—Two specimens (male and female) from Valentia Island are referable to this recently described species according to Rev. C. R. N. Burrows to whom I showed them. I may remark *en passant* that a series taken whilst on a visit to my friend, Mr. W. F. de Visnes Kane, at Drumreask, Co. Monaghan, in August, 1911, also proved to be *crinanensis*. My best thanks are due to Mr. Burrows for kindly examining and determining all these. To those lepidopterists interested in the subject, I would call attention to a valuable paper by Mr. Burrows: "On the Nictitans group of the genus *Hydroecia*" (*Trans. Entom. Soc. London*, Feb. 10, 1912), in which the differences separating the various species are clearly set forth.

***Pechypogon barbalis**, Clerck.—Killarney: an example came to light. Only one doubtful record is given by Kane in his *Catalogue*. Determined by Mr. J. H. Durrant of the British Museum (Natural History).

***Cidaria prunata**, L.—Killarney: two specimens.

***Platyptilia Bertrami**, Rössl.—Killarney: two specimens. Determined by Mr. Durrant.

***Homoeosoma binaevella**, HS.—I took a specimen at the foot of Manger-ton on July 16th. Determined by Mr. J. N. Halbert of the Dublin Museum and confirmed by Mr. Durrant. Only one previous record—from Co. Cork,

COLEOPTERA.

Carabus granulatus L. var. **Interstitialis**, Duft.—Two specimens from the summit of Mangerton. Mr. Halbert thinks are referable to this alpine form characterized by the smoother elytra.

C. glabratus, Payk.—A living specimen was given me by the game-keeper of Mr. Vincent of Muckross demesne who had found it near the top of Mangerton.

Pelophila borealis, Payk.—A single example on the edge of L. Leane, Killarney. Repeated searches failed to discover others.

***Halplus fluviatilis**, Aubé.—Killarney: one specimen. Determined by Mr. E. A. Newbury.

***Homalota longicornis**, Grav.—Killarney: one specimen. Determined by Mr. Halbert.

***Philonthus agilis**, Grav.—Rossbeigh: one specimen. Determined by Mr. Halbert, and confirmed by Mr. Newbury. Only recorded doubtfully from Ireland before.

Aphodius foetens, F.—Fairly common on Rossbeigh sandhills in August *in stercore*.

A. lapponum, Gyll.—On Mangerton, Killarney, and at Glenbeigh on high ground *in stercore ovino*—not uncommon.

***Sitones puncticollis**, Steph.—Rossbeigh: one example. Determined by Rev. W. F. Johnson.

The species with an asterisk prefixed are new records for Kerry.

I have much pleasure in here returning thanks to Messrs. W. F. Johnson and J. N. Halbert, also to Messrs. J. H. Durrant and E. A. Newbury, for kind help in naming species,

Ealing Common, London, W.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Himalayan Bear from Lieut. Stoney, a pair of Rabbits and a pair of Cavies from Mr. H. L. Guinness, eight Goldfinches from Mr. W. W. Despard, and a Snake from Mr. G. C. L. Griffin. A single Lion cub has been born, the parents being "Conn" and "Mitze"; also six Dingo puppies. Among the noteworthy purchases are a young female Chimpanzee, an Aye-aye, two Himalayan Bears, a Common Seal, ten Grey Squirrels, a pair of Purple Gallinules, five Silver Pheasants, a Golden

Plover, a Short-eared Owl, a Gadwall and a Merlin. A White-collared Mangabey has been received on deposit.

The Aye-aye (*Cheiromys madagascariensis*), the only species of a most remarkable lemuroid family, is one of the most interesting animals received in the Gardens for many years. Very few of these mysterious nocturnal creatures from the deep Malagasy forests have ever been shown alive in Europe. The Aye-aye enjoys sponge-cake soaked in milk, a somewhat unnatural food, and it is instructive to watch how this substance is handled with the excessively long and slender middle finger, whose normal function is to draw succulent grubs out of their burrows in the trunks and branches of trees.

A pair of Dublin-bred Lion cubs have been selected by the Council for presentation to the newly established Scottish Zoological Society, whose gardens at Edinburgh will be opened in the summer.

DUBLIN MICROSCOPICAL CLUB.

FEBRUARY 12.—The Club met at Leinster House. D. M'ARDLE (Vice-President) took the chair, and showed fertile specimens of *Lejeunea serpyllifolia* Lib., var. *cavifolia* Ehrb., which he had recently collected in Co. Wicklow. In this country it is extremely rare, being previously recorded only from Co. Kerry, where it grows among mosses and mixed with *L. serpyllifolia*, which is common through the country. The Co. Wicklow specimens of the var. *cavifolia* are larger than those previously found; and the plant grows in some quantity on the trunks of old trees at about 800 feet elevation. An account will appear in a paper now in preparation on the Musci and Hepaticae of the Glen of the Downs, with observations by Professor Kaalaas, of Christiania, and Professor A. Evans, of Yale, Newhaven, Conn., who have examined specimens from Co. Wicklow, as it is also native in both countries.

Dr. B. B. FERRAR showed young living larvae of Salmon and Trout from the fish hatchery at the Dublin Zoological Gardens.

BELFAST NATURALISTS' FIELD CLUB.

JANUARY 29.—GEOLOGICAL SECTION.—Lecture on "Some Features of the Co. Antrim Basaltic Plateau," by JAMES STRACHAN. W. J. C. Tomlinson, Chairman of the Section, presided. The lecturer gave a general description of the main features that characterise the basaltic lavas of Co. Antrim, and a petrological classification of the various types of basaltic rock found in the county, and showed the relationship existing between the lava-flows and the intrusive vents from which they issued. The interesting tube-amygdaloid from the base of a lava-flow was exhibited and discussed. The lecturer referred to the superiority of the dolerite as a material for roads, as compared with basalt, and showed

reason for this from the microscopic structure of the two rocks. Mr. Strachan pointed out that the zeolites were undoubtedly of magmatic origin, and not produced by rock-weathering or solfataric action as generally supposed. The lecturer's views on this point have been accepted recently by leading British petrologists. The origin of the iron ores, he said, was a subject which had received much discussion, and the older views on the matter attributed them to lacustrine conditions. Recently, the Geological Survey had published a memoir in which the iron ores and bauxite were described as having largely originated from the weathering of the basalt *in situ*. The lecturer ventured to dispute this theory as applied to at least the uppermost series of the interbasaltic beds, which undoubtedly showed stratigraphical evidence of sedimentation.

A discussion followed in which A. R. Derryhouse, F.G.S., R. J. Welch, M.R.I.A., S. A. Bennett, B.Sc., Robert Bell, and the Chairman took part.

The proceedings terminated with a vote of congratulation to Robert Bell, on his recent election to the Membership of the Mineralogical Society of London.

FEBRUARY 12.—ARCHAEOLOGICAL SECTION.—W. J. FENNELL, F.R.I.B.A., in the chair. Two addresses were given on this date; the first by a visitor, W. MAYES, on the more notable of the Irish Medallists. The lecturer exhibited about fifty examples of Irish medallists' work. J. A. S. STENDALL followed with a paper on "Irish Tokens."

FEBRUARY 18.—R. J. WELCH in the chair. A. M'I. CLELAND read a paper on "The Gorges of the Tarn, Cevennes." The paper was illustrated by a series of views taken last summer by the lecturer.

The following were elected members of the Junior Section of the Society :—Miss M. K. Duffin, Miss F. M. Ritchie, Miss J. Doherty, Miss N. Humphreys, Miss S. Bell, Miss I. Poyd, and Miss Montgomery.

DUBLIN NATURALISTS' FIELD CLUB.

FEBRUARY 8. VISIT TO THE ZOOLOGICAL GARDENS.—About thirty members and visitors were conducted through the gardens by Professor G. H. Carpenter (Hon. Sec. R.Z.S.I.), Dr. B. B. Ferrar (Superintendent), and Professor J. Bayley Butler. A special demonstration was given in the monkey-house, where Mr. Walter Rothschild's great Chimpanzee "Tom," the Hoolock Gibbon, the Spider Monkeys, and the collection of Ruffed Lemurs were greatly admired. After a visit to the carnivore house at feeding time, the party proceeded to the aquarium where the New Zealand Tuatara and the Mexican Axolotl were shown and discussed. Finally the new fish-hatchery was inspected, eggs and young larvae of Salmon, Brown Trout, and Rainbow Trout being seen in the trays, and studied under the microscope.

THE BELFAST NATURALISTS' FIELD CLUB.
FIFTIETH ANNIVERSARY.

At Whitsuntide this year the Belfast Naturalists' Field Club, the oldest Society of the kind in Ireland, and one of the oldest in the United Kingdom, will celebrate the fiftieth year of its existence. Founded in 1863, as a result of the interest aroused by science classes established by the Science and Art Department, and conducted by Professor Ralph Tate, the Club has for half a century been the centre and inspiration of natural history and geological research in the North of Ireland, and its output of work has been such as any local society might be proud of. The Club now summons its friends to come and join with it in celebrating its fiftieth anniversary. Many scientific societies and institutions are sending official representatives to the meeting, among others, the Geological Society of London, the North Staffordshire Field Club, the Royal Irish Academy, the Royal Dublin Society, the Royal College of Science for Ireland; and naturalists from all parts of our own country will be present.

An interesting programme of meetings and excursions has been arranged. On Saturday, May 10, the President will receive the delegates and visitors in the Examination Hall of the Queen's University, and short speeches will be delivered by several original members of the Club and others. A short excursion will be held in the afternoon, followed by a conversazione in the Assembly Buildings. On the following day (Sunday) a number of unofficial excursions will be organized. On Monday Newcastle will be visited, and Slieve Donard, the highest Ulster hill, will be ascended. In the evening, under the presidency of the Vice-Chancellor of the University, an address will be delivered by Dr. Scharff on "The Relationships of the Irish Fauna."

Next morning the party will start for a five-days' trip along the north coast of Derry and Antrim. For the first day alternative excursions are arranged to the beautiful basaltic precipice of Benevenagh, with its wealth of alpine plants, and the sand-dunes of Portstewart, famous for their remains of Neolithic man. The two parties will proceed together in the evening to the Causeway, where after dinner R. Ll. Praeger will speak on "Problems of the Irish Flora." Wednesday will be devoted to a thorough examination of the Causeway, and the fine headlands to the east of it, and in the evening Dr. Derryhouse will address the members on "Features of Local Geology." Next day the party will move on to Ballycastle, visiting the famous Whitepark Bay, and the remarkable Chalk headland of Kinbane. Friday will be devoted to Fair Head and Murlough Bay, the most beautiful and interesting area in the North-east of Ireland, on account of its imposing scenery, the extraordinary variety of its rocks, and the richness of its fauna and flora. On Saturday a short excursion will be made to Glenshesk, and visitors will reach Belfast in time to catch the evening steamers to English and Scottish ports.

Members of kindred societies and others interested in natural science are cordially invited to attend the meeting. A full illustrated programme, with time-tables, prices of excursions, &c., is about to be issued, and may be obtained from the Secretary of the Club, A. W. Stelfox, Scottish Temperance Buildings, Belfast, who will also furnish any further information required.

The occasion is exceptionally noteworthy as marking an epoch in the progress of natural history studies in Ireland. We hope that the meeting will be, in all respects, a brilliant success and that the Belfast Field Club may start on a new half-century of strenuous and fruitful work.

NOTES.

BOTANY.

Some Results of the International Phytogeographical Excursion, 1911.

Attention should be drawn to a series of articles which have been appearing in the "New Phytologist," 1911 and 1912, on impressions and results of the international meeting. Most of the foreign botanists who were present have recorded their impressions or discussed the ecological or floristic problems arising from their perambulation of the British Isles—H. C. Cowles, F. E. Clements, Jean Massart, C. A. M. Lindman, E. A. Rübel, C. H. Ostenfeld, P. von Graebner, Oscar Drude, C. von Schröter; and of the British members of the party, A. G. Tansley, G. C. Druce, and C. E. Moss have also contributed. Irish vegetation and Irish species come in for a certain amount of attention, and in view of recent discussion on the origin of the British (and Irish) flora, Professor Drude's advocacy of the great age of much of our present flora is of much interest.

ZOOLOGY.

Adders and Toads introduced into Co. Down.

Another case, in addition to those well known, of the failure to establish an alien fauna in Ireland is given, I find, by the late Dr. James Bryce, of Belfast, in his book, "Geology of Arran and Clydesdale." He mentions that Mr. Cleland, of Bangor, introduced a number of Adders and Toads in his grounds (at Rathgael House, I expect), but that the attempt was not a success, as several of the animals were found dead a few months afterwards. This was likely Mr. Rose Cleland, so often mentioned by Thompson in his *Natural History of Ireland*, who was also a friend of Patterson, Hyndman, Waller, and Gwyn Jeffreys, and associated with them in the many dredging expeditions off our coasts in the middle of last century.

R. J. WELCH.

Belfast.

Squacco Heron in Co. Mayo.

An adult male Squacco Heron (*Ardea ralloides* Scop.) obtained last June near Westport, in Co. Mayo, has recently been acquired for the Collection of Irish Birds in the National Museum, Dublin. This small heron is a very rare casual visitor to Ireland in summer and autumn, and Mr Ussher in "The Birds of Ireland" only gives eight records of this species, all of which are from southern counties, except one from Londonderry.

National Museum, Dublin.

A. R. NICHOLS.

Wren on Migration at the Tuskar Lighthouse Lantern.

At 10.30 p.m. on Friday, October 11th, 1912, Mr. Glanville, Principal Lightkeeper, collected a Wren at the lantern of the Tuskar lighthouse, and kindly forwarded the specimen to me. This makes the seventeenth specimen which has been collected in connection with my work on bird-migration at the Tuskar light-station. Of these specimens two were obtained in the autumn of 1911, ten in the spring of 1912, and five in the autumn of 1912.

C. J. PATTEN.

The University, Sheffield.

Notes on the Tree Sparrow.

On January 17th, 1913, I visited a small farm near Johnstown Bridge, Co. Kildare, in order to observe some birds of which I had previously been told. The birds were rather shy, but after waiting a short time, they flew down on to some waste hay which had been scattered in the yard behind the house, this gave me a good opportunity of observing them, as I was concealed within a few yards of the place where they were feeding. The following is a description of the birds taken from the notes which I then made :—

General appearance resembling that of the House Sparrow, but colouring brighter, and slightly smaller. Upper parts, bright chestnut brown, with dark centres to the feathers. Under parts, dull white. Two white bars on the wings. Chin and throat black. Head and the nape of the neck, *bright dark chestnut*. Cheeks, white, with a black triangular patch in the centre. Bill, blackish and strong. White ring or collar almost surrounding the neck. Legs, brown.

There were seven birds in all, three of which I took to be hens, for the following reasons :—

Their plumage was not quite so bright, the head not quite so vivid a chestnut, the white markings not quite so clear, though the black markings appeared the same in each case. Their behaviour also was less assured and aggressive than that of the four others. These latter strutted about, quarrelling amongst themselves, and hunting each other away from the tit-bits, whilst the three kept apart, and were much more subdued and quieter in every way.

On January 27th I again saw the birds, and also on February 1st. On the latter date there were only four visible. They come to the hayrick to feed at about 8.30 a.m. to 10 a.m., and at 2.30 p.m. to 3.30 p.m., at which time hay is taken out to feed the cattle. When they first appeared round the house in the early winter, they were very wild, but are much tamer now. Having carefully examined the specimens of *Passer montanus*, both mounted and unmounted in the Museum (Dublin), I am confident that the birds I observed are the same, which gives them a new locality.

HELEN M. METCALFE,

Enfield, Co. Meath.

Grasshopper-Warbler on Migration at the Tuskar Light-station.

At noon on Monday, September 30th, 1912, Mr. Power, Lightkeeper, discovered a dead Grasshopper-Warbler on the roof of the dwelling-house of the Tuskar light-station. Post-mortem examination showed that the bird had been dead for some days before being discovered. The prevalent direction of the wind had been between south and east, and the force high enough to render the weather decidedly rough. It is very likely that the bird was carried by the strong wind against the lantern glass, and made an "incidental strike." That is to say the victim did not necessarily collide head-foremost. Indeed, the head-lesion in this case was of the most trivial kind, and consisted of only a few minute haemorrhagic spots at the posterior region, *i.e.*, where the head joins the neck. But the back and shoulders were severely bruised. Now as the roof in question is situated on the north to the north-west side of the rock, the bird, when injured by contact with the glass, was, as it dropped senseless, in all likelihood, borne with the wind on to the roof. There, held up by boisterous weather, it probably skulked (even if it recovered the injury sufficient to enable it to fly), and died of exhaustion in a few days.

I left the Tuskar light-station a few hours previous to the discovery of this bird, having carefully searched the roof up to a week before my departure. Having found no birds later than that time, one may safely argue that this Warbler visited the lantern, or at all events came on the roof, not before about September 24th. This makes the tenth specimen which I have collected in connection with my work on bird-migration at the above light-station. Of these specimens one was obtained in the autumn of 1911, four in the spring of 1912, and five in the autumn of 1912.

C. J. PATTEN.

The University, Sheffield.

The Carrion Crow at Lambay.

Mr. May's note on the Carrion Crow at Lambay (*supra*, p. 45), is of much interest. This island has been so frequently visited by naturalists it is remarkable that it should have hitherto escaped attention; moreover, we may assume occasional visits of the bird to the mainland, and here likewise the many keen observers from Dublin and elsewhere have failed to detect it.

The "Carrion Crow" in the Belfast Museum was a Rook some years ago, and a nest near that town, supposed to belong to the Carrion Crow, was really that of the Hooded Crow. There is an old saying that "the misfortunes of others teach us caution," but our best thanks are due to Mr. May for publishing Mr. Mason's observation.

RICHARD M. BARRINGTON.

Fassaroe, Bray.

The Carrion Crow at Lambay.

With regard to Mr. G. C. May's note on the above subject (*supra*, p. 43) one would like to have some evidence of identification. How, for instance, did Mr. Mason distinguish the bird from a young rook? Assertions of knowledge however vigorous are not very convincing in such reports without evidence of identification. No one can expect a record of a rare bird having been seen to be accepted, however good an ornithologist the observer may be, unless he gives proof of how he identified the bird.

High Holborn, London.

H. F. WITHERBY.

Early Swallows at Ardmore.

My father, Mr. R. J. Ussher, wishes me to say that on the 14th March my husband and I observed a Swallow here, and about an hour afterwards one of my daughters came in saying that she had seen a Swallow in the yard of our house. I know the Sand Martin and did not mistake it for a Swallow. The bird I saw was black above, and had the long pointed tail of a Swallow.

Ardmore, Co. Waterford.

ISABEL M. ODELL.

The supposed former Occurrence of the Wild Cat in Ireland.

I think the last note dealing with the subject of the former presence in Ireland of the Wild Cat was one by Mr. Warren in the *Irish Naturalist* of April, 1911 (vol. xx., p. 80). Mr. Warren's criticism of the veracity of country people in that note is rather severe. He thinks the stories about the Wild Cat may all be put aside as being of like value as other mythical stories of fairies, banshees, etc. I doubt whether Mr. Warren's opinions are shared by many other naturalists. At any rate it is of importance to place on record stories about the former existence of the Wild Cat in Ireland. If we should at any future time receive information acceptable to Mr. Warren, that this creature once lived in this country, such stories will be of undoubted value to any one engaged in writing the history of the Wild Cat in Ireland.

The object of my present note is to point out to the readers of the *Irish Naturalist* an interesting passage in a book written in the early part of the last century by W. H. Maxwell. In this book—"Wild Sports of the West"—to which my attention was directed by Miss Knowles, there are a good many valuable faunistic observations. In chapter xxxiii. the writer alludes to the capture of a Wild Cat in Mayo, stating that it was of a dirty gray colour, double the size of a house cat, and with teeth and claws more than proportionately larger. Besides this large and ferocious species, he says, the warrens upon the coast suffer much from the common cat becoming wild, and burrowing in the rabbit-holes.

National Museum, Dublin.

R. F. SCHARFF.

FURTHER NOTES ON THE BURNT GROUND
FLORA OF KILLINEY HILL.

BY NATHANIEL COLGAN, M.R.I.A.

IN last year's April issue of this Journal,¹ an account was given of some observations made in the autumn of the preceding year on what was termed the renascence flora of certain burnt areas on Killiney Hill, Co. Dublin, areas once densely clad with old gorse and reduced in a couple of hours to a vegetable *tabula rasa* by a fire which broke out on the night of July 7th, 1911. Three months after the fire there were found living within these burnt areas 13 species of flowering plants, partly survivals from the old root-stocks, partly immigrants from adjacent unburnt areas, and partly, perhaps, the product of seeds which had retained their vitality throughout the fire and within the areas laid waste by it. In the present paper it is proposed to give a record of some further observations on the flora of this burnt ground made at intervals varying from 14 to 18 months after the fire.

My first survey of the ground for the year 1912 was made on the 1st September, just 11 months after the last survey of the preceding year, and 14 months after the date of the fire. On this occasion, 39 species of phanerogams and 2 species of cryptogams were found growing well within the burnt areas. A second visit on the 6th October last added 4 phanerogams, 3 others were added on the 22nd December, a further addition of 7 phanerogams and 5 cryptogams was made on the 26th December, 2 phanerogams were added on the 5th January of this year, and a week later, on the 12th January, a final addition of 2 cryptogams was made. A total renascence flora of 64 species, (55 phanerogams and 9 cryptogams) was thus found to have taken possession of the areas burnt clear of all vegetation, eighteen months before. Although the largest number of species listed on any one visit was 55, the number observed on the 26th December last, it may be assumed that the remaining species listed on previous or subsequent visits were merely overlooked on this date, and that all 64 species

¹ Vol. xxi., 1912, p. 72.

were present simultaneously on the burnt ground in the first week of January, 1913, or 18 months after the fire.

The nature of this renascence flora may best be understood when the species are arranged in the three groups set out below: (a) Introduced or Immigrant Species, including all plants which had certainly or with a high degree of probability entered the burnt areas after the fire from adjacent unburnt areas; (b) Survivals, or species which persisted in the burnt ground throughout and after the fire, and (c) Species of doubtful standing, since it was not possible to determine with certainty whether they were immigrants or survivals. In the following lists the prefixed letters C, Fr. and R, denote, respectively, that a species was found to be common, frequent, or rare.

List of Plants found growing on the Burnt Ground of Killiney Hill in the first week of January, 1913, eighteen months after the apparently complete destruction by fire of the original flora.

(a) *Immigrants.*—45.

R. <i>Sisymbrium officinale.</i>	Fr. <i>Taraxacum officinale.</i>
Fr. <i>Cardamine hirsuta.</i>	C. <i>Sonchus oleraceus.</i>
R. <i>Stellaria media.</i>	R. <i>Anagallis arvensis.</i>
R. <i>Cerastium triviale.</i>	R. <i>Myosotis arvensis.</i>
R. <i>Geranium molle.</i>	Fr. <i>Digitalis purpurea.</i>
Fr. <i>Acer Pseudo-platanus.</i>	R. <i>Veronica serpyllifolia.</i>
R. <i>Trifolium minus.</i>	Fr. <i>Plantago lanceolata.</i>
Fr. <i>Alchemilla arvensis.</i>	R. <i>Juncus bufonius.</i>
Fr. <i>Cotyledon Umbilicus.</i>	C. <i>Anthoxanthum odoratum.</i>
R. <i>Epilobium obscurum.</i>	Fr. <i>Agrostis canina.</i>
R. <i>Sambucus nigra.</i>	C. <i>Aira praecox.</i>
Fr. <i>Galium saxatile.</i>	R. <i>Dactylis glomerata.</i>
Fr. <i>Bellis perennis.</i>	C. <i>Holcus mollis.</i>
Fr. <i>Tussilago Farfara.</i>	C. <i>Poa annua.</i>
C. <i>Senecio vulgaris.</i>	C. <i>Lolium perenne.</i>
C. <i>S. sylvaticus.</i>	Fr. <i>Marchantia polymorpha.</i>
R. <i>S. Jacobæa.</i>	C. <i>Funaria hygrometrica.</i>
R. <i>Crepis virens.</i>	C. <i>Barbula fallax.</i>
R. <i>C. taraxacifolia.</i>	Fr. <i>Polytrichum piliferum.</i>
Fr. <i>Cnicus lanceolatus.</i>	F. <i>P. juniperinum.</i>
Fr. <i>Hypochaeris radicata.</i>	Fr. <i>P. commune.</i>
R. <i>Leontodon autumnalis.</i>	Fr. <i>Parmelia conspersa.</i>
R. <i>Parmelia omphalodes.</i>	

(b) *Survivals.*—13.

R. <i>Corydalis claviculata.</i>	Fr. <i>Calluna vulgaris.</i>
C. <i>Ulex europæus.</i>	Fr. <i>Teucrium Scorodonia</i>
Fr. <i>Rubus fruticosus.</i>	R. <i>Urtica dioica.</i>
R. <i>Potentilla Tormentilla.</i>	Fr. <i>Carex binervis.</i>
Fr. <i>Epilobium angustifolium.</i>	Fr. <i>Pteris aquilina.</i>
Fr. <i>Erica cinerea.</i>	R. <i>Buddleia variabilis.</i>
R. <i>Leycesteria formosa.</i>	

(c) *Of Doubtful Origin.*—6.

C. <i>Sedum anglicum.</i>	R. <i>Rumex Acetosa.</i>
Fr. <i>Betula pubescens.</i>	Fr. <i>Festuca ovina.</i>
C. <i>Rumex Acetosella.</i>	Fr. <i>Nardus stricta.</i>

However numerous in species the phanerogamic flora was found to be, in mass it fell far short of the associated cryptogamic flora, though the latter was singularly poor in species. Two common mosses, *Funaria hygrometrica* and *Barbula fallax* were dominant above all other species in the burnt ground flora of January last. Taken together, these two species covered fully one-half of the total area occupied by vegetation within the burnt ground, and none of the phanerogams approached either of them in the extent of surface occupied. The first-named of these mosses, *la Charbonnière* of the French, so called in allusion to its marked predilection for burnt ground, was rather more abundant than the second, although the *Barbula* was more conspicuous by reason of the ruddy brown colour of its innumerable immature fruiting stems. The only other mosses noticed were three common species of *Polytrichum*, *P. piliferum*, *P. juniperinum*, and *P. commune*. These were generally distributed in scattered patches but covered no considerable surface. I am indebted to Mr. David McArdle for confirmation or correction of my naming of these burnt ground mosses. As for the remaining cryptogamic species, *Marchantia polymorpha* was found to be frequent and luxuriant in various stages of fructification from September

to December last within the burnt areas of Killiney Hill, especially on the southern side, where the largest continuous burnt area is found, fully half an acre in extent, and occupying a steep, roughly-terraced granite slope, facing almost due east. Bracken shoots appeared here and there, and two lichens were noted in small quantity, and confined to a few rocks near the upper edge of this burnt ground. These Miss Knowles has kindly named for me. They are the common species *Parmelia omphalodes* and *P. conspersa*.

Amongst the 37 phanerogamic immigrants the grasses were strongly predominant. Indeed, outside of this Order only two or three flowering plants played any important part in reclothing the surfaces swept bare by the fire. Arranged roughly in the order of their dominance, that is to say of the extent of surface occupied, the following were the most noteworthy species :—

<i>Holcus mollis</i> .	<i>Poa annua</i> .
<i>Anthoxanthum odoratum</i> .	<i>Senecio sylvaticus</i> .
<i>Lolium perenne</i> .	<i>S. vulgaris</i> .
<i>Aira praecox</i> .	<i>Sonchus oleraceus</i> .

The first four of these far exceeded the others in the mass of vegetation produced.

It will be seen that this large group (a) of immigrant or invading species is more than twice as large as the other two groups taken together, the groups made up of survivals and of species of doubtful provenance. This is no more than might have been expected, nor is there anything unexpected in the botanical constitution of this immigrant group. It is made up chiefly of species provided with special contrivances for seed dissemination, or with very light or minute seeds or spores adapted to wind carriage. There are no less than 30 of such species to 15 species not specially adapted for dissemination. One of the most prominent of these specially adapted species was *Senecio sylvaticus*, which amongst flowering plants is no less characteristic of burnt ground than is *Funaria hygrometrica* amongst cryptogams. The vigour, abundance and ubiquity

of this *Senecio* on the Killiney Hill burnt ground was remarkable. Seedlings, young flowering plants, and thickets of withered stems appeared in profusion in September last, when a careful measurement gave to some of these old stems a height of 4 feet ! Of the 15 species not specially adapted for dissemination, not one was found to be common, and rather more than half were quite rare ; of the 30 specially adapted species, 10 were common and only one-third were rare.

Passing to the second group (*b*) of surviving species, it may be noted that taken as a whole and as it stood at the opening of January last it played a distinctly subordinate part in providing a new vegetable carpet for the blackened hill slopes. Shoots from the old gorse stumps were very numerous and occasionally reached to 18 inches in height ; here and there the Ling and the Purple Heather were sprouting from the old roots, but as yet had hardly attained to more than 2 inches in height ; shoots from the Wood Sage, too, were fairly frequent and some fine tufts of *Carex binervis* were seen, but the total mass of vegetation produced by these species was inconsiderable.

This group of survivals, however, small though it was in mass, contained some interesting members. Taken in their order, *Corydalis claviculata* comes first. A fine plant of this rare species, well-known to inhabit Killiney Hill, appeared on the edge of the steep scarp of granite which forms the boundary of the chief burnt area on the southern side of the hill, and is marked " Dangerous " by notice boards placed at intervals. This plant grew up right beside the charred stump of an aged gorse bush which had borne the full brunt of the fire. The hard, black, polished seeds of *Corydalis* are quite unfitted for wind dispersal, but their smooth surface and lenticular form enable them to slip readily into cracks or crevices of the soil where they might easily escape destruction by fire. This species, in Dublin, at all events, peculiarly affects gorse spinnies, and I have twice observed its renascence in quantity in such stations after the firing of the gorse, once in the Dingle, Glenamuck, in 1900, and again on Killiney Hill in 1902.

Of peculiar interest amongst the survivals was *Epilobium angustifolium*, the Rose Bay, a species generally rare in Ireland, and not hitherto certainly known to occur in Co. Dublin. This was obviously a survival in the burnt ground, and was merely unveiled by the fire which had swept away the scrub which concealed it without destroying its deep-seated and long-established root-stocks. The first specimen was noticed on the 1st September last, when a clump of bright red stems a few inches high and crowned by small rosettes of leaves was found springing from a blackened cleft in the granite, well inside of what had been the fire zone. The plant was puzzling to one unfamiliar with its early stages, but all doubts as to its identity were set at rest on the 22nd September, when three other specimens were found in full flower. Further search showed that fully a dozen old plants were scattered over the hill, about 8 of these being within the burnt areas. Some of the finer specimens between 3 and 4 feet in height with numerous stems were rooted on almost inaccessible shelves of granite on the face of the steep scarp which sweeps in a curve round the south and south-east sides of the hill above Vico Road, and had all the appearance of natives. Most of the examples of this species found growing on the hill appeared to belong to the obscure form or variety *brachycarpum* of Leighton, distinguished by its broad leaves, obliquely pointed buds, and short, spreading pods. This is said to be the cultivated form, but so far as I can discover this means simply the wild form selected for, not the form produced in, cultivation. If this be so, then there is nothing in the form of the plant found established on Killiney Hill to negative its claim to be regarded as native there, and moreover, some of the plants with erect pods upwards of 3 inches long were doubtfully referable to this so-called cultivated variety. Whether the species be really native here or not, is perhaps impossible to determine, as the plant is often cultivated and its seeds, in common with those of all the *Epilobiums*, are specially adapted for wind disposal. Whatever the standing of the plant may be on Killiney Hill, it is certainly fully established there, where for many years,

no doubt, it has eluded discovery, only to be brought to light by the devastating fire of July, 1911.¹

As for *Ulex europaeus*, while shoots from old burnt stems were numerous at the opening of the present year, seedlings were then extremely rare in the burnt ground although they were seen there in abundance 3 months after the fire.

A couple of well-grown plants of *Leycesteria formosa*, a relative of our native Woodbine introduced from the Nepal Himalayas and now familiar in shrubberies, were found on the edges of the burnt ground, and, more clearly within the fire zone, a single plant of *Buddleia variabilis* appeared. Both of these exotics are cultivated in the immediate neighbourhood of the hill. The first species, which bears succulent berries, was probably introduced to its hill station by the agency of birds, the second was undoubtedly wind-borne, for its seeds are provided with remarkably extended wings which admirably fit it for long aerial voyages. From their apparent age, both of these species must have originated in their present stations before the date of the fire which helped to reveal their presence; but as neither occupies a position approaching the focus of the fire, their survival is of no great interest as a proof of heat-resisting capacity.

In the list of doubtful plants two species are noteworthy for their importance as elements in the vegetable clothing of the burnt ground, *Sedum anglicum* and *Rumex Acetosella*. The second of these may, perhaps, have originated from seeds which survived in the burnt areas, as seedlings were found there some three months after the fire. It is more probable, however, that it was introduced after the fire, and this probability is much stronger in the case of the *Sedum*, which is abundant in rocky and open places all over the hill and has minute light seeds well fitted for wind dispersal. Together, these two species occupied a

¹The shoots from the creeping rhizome of a specimen found sprouting in the middle of the burnt ground early in March last extended over a space two yards in diameter.

considerable area. Birch seedlings in different stages of growth were frequent, some up to three inches in height, but it was not possible, as it was in the case of the equally numerous Sycamore seedlings, to decide whether any of these had sprung from seed which had reached the burnt ground after the fire.

Before proceeding to sum up the results of the observations just recorded and discussed, it will be convenient to arrange here in one view, roughly in the order of their mass or dominance and without reference to their origin, the species which were found to play any important part in re-clothing the burnt ground at the opening of this year. Out of the total renascence flora of 64 species, only the following 14 deserve mention in this connection :—

<i>Barbula fallax.</i>	<i>Poa annua.</i>
<i>Funaria hygrometrica.</i>	<i>Ulex europaeus.</i>
<i>Holcus mollis.</i>	<i>Senecio sylvaticus.</i>
<i>Anthoxanthum odoratum.</i>	<i>Rumex Acetosella.</i>
<i>Lolium perenne.</i>	<i>Senecio vulgaris.</i>
<i>Sedum anglicum.</i>	<i>Sonchus oleraceus.</i>
<i>Aira praecox.</i>	<i>Carex binervis.</i>

On a general survey of this new flora perhaps the most salient fact which emerges is the conflict between its higher and lower elements, between the phanerogams and the cryptogams. Relatively few in species though they be, only 9 out of a total of 64, the lower plants are yet conspicuously dominant, one-half of the total vegetable clothing of the burnt ground being contributed by the two mosses which stand at the head of the above list. So far, these species have kept in check the much more varied phanerogamic flora ; they have probably killed off the seedling gorse, and, for a time at least, have secured unmistakeable dominance. Is this dominance of the cryptogamic element likely to be permanent ? And if not, in what manner is the competing phanerogamic element likely to assert its predominance ? Which of its species will increase and which decrease or disappear as the struggle for existence goes on ? What,

in short, will be the final condition of floral equilibrium arrived at ?

It may, I think, be asserted with confidence that the now dominant cryptogams will before long give way to the higher plants, and for this amongst other reasons that their present dominance is largely the result of abnormal climatic conditions. The summer of 1912 was, in fact, a remarkably wet one in Co. Dublin, and generally throughout Ireland, and should the summer of this year prove to be one of average dryness, then the perennial phanerogams may be expected to gain rapidly on the annual cryptogams. The open spaces will more and more be invaded by the already well-established grasses, by the Foxglove and by *Sedum anglicum* and *Galium saxatile* ; later on the Bracken and the moorland grasses and sedges such as *Agrostis canina*, *Festuca ovina* and *Carex binervis* will enlarge their domain, the gorse shoots and the shoots of the Ling and Purple Heather will rapidly increase in size and in number, while the annual phanerogams will be slowly crowded out ; and so the *facies* of the flora will gradually change and a reversion to the vegetable *status quo ante* will set in. If not this year, then the next, sooner or later the first steps in this reversion will become manifest. But the reversion, when it is finally brought about will not be a complete one. Here and there a young wind-borne Sycamore or Birch or a young Elder sprung from a bird-sown seed will maintain its ground, so that an element of difference will mark off the new vegetable equilibrium from the old.

How much of truth there may be in this forecast, the record here given of the state of the Killiney Hill renascence flora at the opening of the year 1913, will enable the future observer to decide.

Sandycove, Co. Dublin.

WILD CATS IN IRELAND.

BY ROBERT WARREN.

In the *Irish Naturalist* for April (*supra*, p. 84), Dr. Scharff refers to some notes of mine in the *Irish Naturalist* for 1911 (vol. xx., p. 50), on the supposed existence of the Wild Cat (*Felis catus*) in Ireland. He says—"Mr. Warren's criticism of the veracity of country people is rather severe." I still adhere to the opinion that the stories of Wild Cats by the country people should not be credited, as referring to the true Wild Cat, but to the domestic cat run wild, and wild-bred for many years among the woods and rabbit warrens throughout the country. Living this wild life, and feeding on their natural food of birds and small quadrupeds—after the lapse of many generations of this wild life, they attain to a size and strength far beyond that of the tame house cat. When I first came to reside at Moyview, Co. Sligo, in 1851, there were some rabbits about the place, but no care was taken of them, and none were trapped, so there was no check put to the increase of the wild-bred cats living in the woods and plantations. I frequently came across them, but, on being disturbed, they always took refuge in rabbit holes.

Having some friends pheasant-shooting, one day as we were beating some thick bushes and briars, an immense grey cat bolted, and was knocked over by one of the guns, but so tenacious of life was the brute, that it took a second barrel to finish him. He was an old male, of the true Wild Cat colour, having a thick coat of coarse fur. All present were surprised at his size, which was at least a third larger than that of a house cat, and when I lifted the carcase from the ground, its weight astonished me. Afterwards I regretted that I did not take his measurements and weight to show to what a size and weight these wild-bred cats attain.

The following year I began trapping the rabbits, and from time to time the trappers caught cats of various colours, as large as the individual shot. However, when we cleared out the old stock, none of their successors were permitted to live long enough to attain the size and weight of their veteran ancestors. No doubt, a great deal has been talked about the Wild Cat being a native, but up to the present, no specimen of the *Felis catus* has been forthcoming, Irish-killed, and with authentic information of date and locality where captured.

Some years ago, when my valued friend the late A. G. More was appointed Curator of the Dublin Museum, visiting him one day, he asked me if I would like to see a specimen of a Donegal Wild Cat. I replied—"That is a sight I never expect to see." "Well," he said, "come with me to the case and I will show you a specimen of a cat exhibited before the Zoological Society by a well-known London naturalist, and afterwards presented by him to the Dublin Museum as a true Wild Cat captured in Donegal." The specimen was that of a large male wild-bred cat, and the only resemblance to *Felis catus* was his grey colour and size. "Why is the specimen kept in the case?" I asked More. "I am going to regulate all the cases," he replied, "but have not had time yet to attend to this case, and turn out this impostor to the scrap heap."

Here is an instance of a well-known London naturalist being mistaken, and probably led astray by the idle tales of country people.

Dr. Scharff refers to that interesting book by Maxwell—*Wild Sports of the West*, as some evidence of the Wild Cat being a native (Maxwell's book was published as far back as 1832) and quotes several passages from it respecting Wild Cats, which I have been aware of for over fifty years, but I have never credited them as evidence of the Wild Cat being a native, always considering that the cats spoken of were the wild-bred house cats run wild, and living and breeding in rabbit warrens; also, the cat mentioned as mauling the rabbit-catcher so badly could well be an old

wild-bred male of the grey colour, which would be quite powerful and savage enough to do the injury to the rabbit-catcher.

This statement by Maxwell was written eighty years ago, and yet since then no true Wild Cat has turned up. Thompson, who mentions the names of his correspondents who wrote to him about Wild Cats, and who had every opportunity of investigating the statements, never got satisfactory evidence, and in the fourth volume of his *Natural History of Ireland* he cautiously says—"Cannot be given with certainty as a native animal." We can now come to ten or twenty years later, when the late Robert Ball was custodian of the Trinity College Museum; he never saw a true Wild Cat, neither did Dr. Carte, Director of the Dublin Museum, nor his successor, A. G. More; nor, if I am correct, has my friend Dr. Scharff, the present obliging Keeper of the National Museum. Looking over the *Proceedings of the Dublin Natural History Society* for 1862, I came on some interesting notes by the late F. G. Foot, on the mammalia of the west coast of Clare. Speaking of the Marten he says—"It is known by the country people as Cot Krine—the cat of the woods." Of the Wild Cat (*Felis catus*) "I have not been able to ascertain for certain of the existence of the Wild Cat in Clare. I have often been told of its existence in different places, but on close enquiry, they turned out to be Martens, or tame cats run wild."

Ardnaree, Monkstown, Co. Cork.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Macacque Monkey from Capt. A. W. A. Irwin, two Guinea-Pigs from Miss D. Summers, an African Grey Parrot from Mr. T. Fox, a Roseate Cockatoo from Mr. Hills, and a Tortoise from Mrs. Griffin. Two Wallabys have been born in the Gardens. A Brown Capuchin Monkey, three Tree Porcupines, a pair of Squirrels, two Indian Rollers, Nine pairs of American Homer Pigeons, a pair of Brent Geese, and three pairs of Shoveller Ducks have been acquired by purchase.

DUBLIN MICROSCOPICAL CLUB.

MARCH 12.—The Club met at Leinster House, J. H. WOODWORTH (President) in the chair.

Dr. G. H. PETHYBRIDGE exhibited a new species of fungus (*Phytophthora erythroseptica*) which he had discovered to be the cause of a specific form of rot in the potato tuber which is quite distinct from that caused by *P. infestans*, or by any of the hitherto described pathogenic bacteria or fungi, and for which the name "Pink Rot" has been suggested. The interest of the fungus lies not alone in its being new to science, but more in the fact that its mode of sexual reproduction is quite different from that described for any fungus up to the present. The female organ (or oogonium) at its inception enters the male organ (or antheridium) at or near the base of the latter, grows up through it, bursts out at the summit, and forms there the oogonium proper, in which a typical thick-walled resting spore is developed. Whether actual fertilisation occurs or not has not yet been determined, but if it does it must take place before the formation of the oogonium proper, or of the oosphere within it. In conjunction with Mr. P. A. Murphy he had also found that the recently discovered resting spores of *P. infestans* as well as those of *P. Phaseoli* are developed in the same way, as are also probably those of Coleman's *P. omnivora* var. *Arecae*. Those of *P. Cactorum*, *P. Syrnigae*, etc., are, however, formed in the usual way by the penetration of the oogonium laterally by an extension from the antheridium. Hence the name *Phytophthora* is to be retained for those species only which agree with *P. erythroseptica* in their mode of sexual reproduction, while that of *Nozemia* is suggested for the other species formerly included under the genus *Phytophthora*. Full details will be found in the *Scient. Proc. Royal Dublin Society*, vol. xiii., nos. 35 and 36, 1913.

R. SOUTHERN showed a specimen of *Amphioxus lanceolatus* (Pallas), dredged in 20 fathoms in Dingle Bay, on a bottom of fine gravel and sand. This species has previously been found in Bantry Bay, and is widely distributed on the shores of the North Atlantic, Mediterranean, and Ceylon. The distinctive characteristics of the species were demonstrated, and its position as a primitive vertebrate discussed.

Sir F. W. MOORE showed the labellum of *Masdevallia triangularis*, a little Orchid from Colombia. The lip in this species is sharply bent back on a very delicate and mobile joint, so that the apex stands in front of the column, and on the apex is borne a group of dark hairs, apparently black in colour, but when examined under the microscope they are seen to be dark brownish red. A slight pressure causes the lip to bend at the hinges, and on being released it quickly springs back again. The peculiar structure of this hinged joint was clearly demonstrated.

BELFAST NATURALISTS' FIELD CLUB.

MARCH 12. ZOOLOGICAL SECTION.—R. H. WHITEHOUSE, M.Sc., lectured on "The Structure and Life-history of Sea-Squirts."

DUBLIN NATURALISTS' FIELD CLUB.

JANUARY 14TH. ANNUAL GENERAL MEETING.—W. F. GUNN (President) in the chair. The Hon. Secretary (R. SOUTHERN) read the Committee's Report for 1912. This showed the membership of the Club to be 96. Considerable discussion followed, and various members expressed dissatisfaction with the programme of excursions held during the last year. The Report was then carried on the motion of the President, seconded by H. W. D. Dunlop. The Hon. Treasurer (H. GORE CUTHBERT) then presented his annual report and balance sheet, which showed that the financial position of the Club was somewhat less favourable than that of the preceding year. On the motion of the President, seconded by H. W. D. Dunlop, the Hon. Treasurer's Report was adopted. A vote of thanks to the Council of the Royal Irish Academy for allowing the Club the privilege of meeting in their rooms, and to the Dublin Press for reporting the proceedings of the Club, was moved by N. Colgan, seconded by C. B. Moffat, and carried unanimously. The list of nominations of Officers and Committee was then read out, and as the requisite number, only, had been nominated, the President declared them all elected, with the exception of T. Hallissy and R. Southern, who had withdrawn their names. The following is a list of the Officers elected for the year 1913 :—President, W. F. Gunn ; Vice-President, N. Colgan ; Hon. Treasurer, H. Gore Cuthbert ; Hon. Secretaries, C. M. Selbie and G. R. Humphreys. N. E. Stephens and Miss I. G. Webb were elected to fill vacancies on the Committee.

Miss I. Denning and Miss J. Gilmore were elected members of the Club.

The following exhibits were on view :—R. SOUTHERN—a chart showing the bathymetrical range of the Irish Gephyrea. W. F. GUNN—a microscopic preparation of the Radiolarian Polycistina. W. B. Wright—a number of photographs illustrating the Glacial geology of Scotland.

FEBRUARY 11TH.—N. COLGAN (Vice-President) in the chair. C. B. MOFFAT read a paper on "Bees and Flowers." The paper which was largely based on observations made by Mr. Moffat himself proved most interesting, and it has been published in the April number of the *Irish Naturalist* (*supra*, p. 65). The following members took part in the discussion which took place :—Messrs. Praeger, Colgan, Halbert, Wright, and Cuthbert. W. B. Wright exhibited some British sapphires, and copper ore from County Kerry.

Miss N. Hinkson was elected a member of the Club.

NOTES.

Phenological Observations.

The Royal Meteorological Society has for a number of years past collected observations on the dates of flowering of plants, and the first appearance of birds, insects, &c., in order to determine the effects of weather upon natural periodical phenomena. There are many parts of the country unfortunately, from which observations have not been received. The Council are desirous if possible of increasing the number of observers so as to cover a larger area. We are desirous to endeavour to persuade some of our readers to become observers on behalf of this Society. We can send to them forms for entering up the observations, which have been received from the Society.

BOTANY.

Viola Reichenbachiana in Down and Fermanagh.

On 25th March I had the pleasure of finding several good clumps of the above Violet in full flower growing on the Lagan Bank at Edenderry, Co. Down. There are several known stations for the plant in Co. Antrim, but so far as I can find it has not been recorded before from Co. Down. This violet is abundant on hedge banks in the district west of Lisbellaw, Co. Fermanagh. The name was kindly verified by Miss Knowles.

N. CARROTHERS.

Belfast.

ZOOLOGY.

Carriion Crow on Lambay.

I beg to say that the black Carriion Crow which I reported to Mr. May was here from about the middle of December, 1912, to first week in March, 1913 (nearly three months). I have never seen one of those crows in Ireland until this bird appeared here. My son and myself saw this bird daily, and I was frequently near enough to have shot it. My son lived as a keeper in Yorkshire, and shot two or three of those birds. There are a good many common crows or Rooks on the island, but this bird always kept to itself, and its "caw" is quite different. I have seen the letters in the *Irish Naturalist*, and I beg to say that both my son and myself are quite satisfied that this bird was the black Carriion Crow. I am very sorry that some naturalist was not here to identify this bird. I have been on the island nearly eight years. The common Grey Crow has been seen flying over on a few occasions, and only yesterday morning my son saw two of them settle near the Seal Hole.

FRANCIS MASON

Lambay, Co. Dublin.

REVIEW.

ANTRIM VOLCANIC ROCKS.

The Interbasaltic Rocks (Iron Ores and Bauxites) of North-east Ireland.

By G. A. J. COLE, F.G.S.; S. B. WILKINSON; ALEXR. M'HENRY, M.R.I.A.; J. R. KILROE, A.R.C.Sc.; H. J. SEYMOUR, B.A., F.G.S.; C. E. MOSS, D.Sc., and W. D. HAIGH, A.R.C.Sc.I. (Memoirs of the Geological Survey of Ireland.) Pp. vi. x 130. Maps, 6 plates, and 23 text figures. Dublin: H.M. Stationery Office, 1912. Price 3s.

At last this long-expected memoir is before us, and in our opinion the officers of the Survey are to be congratulated most highly on their work.

In a preface by the Director the principles on which the revision was undertaken are fully explained, and in the first chapter the same writer gives an interesting historical account of the investigation of the iron-bearing zone between the lower and upper basalts of the district, comparing the deposits with the laterites of tropical countries, and concluding that "The laterites and lithomarges of North-eastern Ireland . . . cannot be connected either with volcanic explosions or with accumulations in lakes, but must be regarded as typical examples of soils and sub-soils formed under conditions now prevalent, in regions of seasonal rains, nearer the equator."

Mr. S. B. Wilkinson describes the deposits of the northern district and concludes that there is no evidence of their pyroclastic origin, but that they are the result of deep decomposition in place of the basalt. The East Antrim district is described by Mr. A. M'Henry. In the Glenarim valley grey bauxite takes the place of red iron-ore, and from included quartz crystals and the occurrence of a rhyolitic gravel it is concluded that this deposit was formed by the weathering of the Antrim rhyolites, which are therefore thought to be of interbasaltic age.

The Mid-Antrim area was resurveyed by Mr. J. R. Kilroe. It includes amongst others the Parkmore mines, which are still worked on an eight-to twelve-inch seam of ore yielding some 40 per cent. of iron. The southern district was entrusted to Professor H. J. Seymour, and considerable interest centres in the famous fossil plant locality at Ballypalady. The Lough Neagh clays and lignites are discussed in this connection, and it is concluded that they were derived by denudation and redeposition from the interbasaltic beds. Dr. C. E. Moss gives in chapter vi. an account of the fossil plants from Ballypalady and other localities. Numerous analyses of the interbasaltic ore deposits follow, and include bole ochre and lithomarge, bauxite, and iron-ores.

Several excellent colour-printed maps accompany the memoir, which is also illustrated by numerous diagrams and photographs. The general make-up of the volume leaves much to be desired, the binding is clumsy, and the workmanship bad. Several of the photographic plates (notably pl. vi.) are cut down so as to leave practically no margin, while the ghastly attempt at colour-printing which forms the frontispiece would be a disgrace to a halfpenny comic paper.

A. R. D.

THE COMING OF AGE OF THE
“IRISH NATURALIST.”

ON April 23rd the “coming of age” of the *Irish Naturalist*—whose first number appeared in April, 1892—was most agreeably commemorated by a dinner given to the Editors and to a large number of the supporters of the Journal by the joint hospitality of Mr. R. M. Barrington, Mr. N. Colgan, Dr. R. F. Scharff, and Mr. R. J. Ussher. The idea that an event so worthy of note as the completion of the *Irish Naturalist*’s twenty-first year should not be allowed to pass by without some form of celebration had been first put forward by Mr. Colgan, and was warmly taken up by the three other hosts, with the result that a gathering representative of every branch of natural history was brought together to honour the occasion.

The dinner, which took place at Mills’s Rooms, 8, Merrion Row, Dublin, was presided over by Mr. Barrington, the three other hosts, and the three editors, as principal guests, occupying seats near the chair.

There were also present Sir Charles Ball, Canon Lett, Mr. John Adams, Professor Bayley Butler, Major G. E. H. Barrett-Hamilton, Professor Grenville Cole, Professor T. Johnson, Mr. G. P. Farran, Dr. A. H. Foord, and Messrs. J. N. Halbert, T. Hallissy, J. de W. Hinch, George R. Humphreys, C. B. Moffat, C. M. Selbie, R. Southern, Alexander Williams, W. J. Williams, and W. B. Wright.

Letters regretting inability to accept were read from Sir F. Moore, the Hon. R. E. Dillon, Rev. H. Friend, Professor E. J. McWeeney, Mr. D. R. Pack-Beresford, Mr. W. F. de Vismes Kane, Professor Haddon, Mr. H. K. G. Cuthbert, and others.

The table decorations included a fine display of flowering Mediterranean Heath, fresh from the Curraun peninsula, and other characteristic plants of the Western-Irish

“Lusitanian” flora. On the menu cards, painted for the occasion by Mr. Alexander Williams, were charming pictures of Irish birds and plants—the design on the cover of this Journal being artistically reproduced—minus the Kerry Slug—on one card.

At the conclusion of the dinner, speeches were delivered by the hosts and others congratulating the editors on the zeal and persevering courage with which they had directed the Journal for so long a time, and on the high standard of merit which it was acknowledged to have maintained under their guidance. Allusions were made to the difficulties which had attended former efforts to promote the advancement of natural history in Ireland, when “splitters” and “lumpers” were apparently afraid to meet together lest breaches of the peace should occur! The editors, in their turn, expressed willingness to continue the efforts of which such appreciation had been shown—acknowledging at the same time the importance of the help rendered by the publishers, and of late years by the guarantors’ committee in freeing them from financial responsibility.

An interesting discussion then took place on the question whether fresh means could be suggested for improving the circulation of the *Irish Naturalist*. Amongst those who took part in this discussion were the Chairman, Sir Charles Ball, Canon Lett, Major Barrett-Hamilton, Professor Johnson, Dr. Scharff, Professor Bayley Butler, Mr. Adams, and the three editors. Various suggestions on minor points were approved, but all idea of any fundamental change in the direction of “popularising” or lowering the tone of the Journal was strongly deprecated.

There is reason to believe that the dinner and discussion may not be without fruit in insuring further encouragement to the *Irish Naturalist* in its useful career, to which all true nature-lovers must wish abundant success.

C. B. MOFFAT.

ADDITIONS TO "IRISH TOPOGRAPHICAL BOTANY" IN 1908—1912.

BY R. LLOYD PRAEGER.

It is five years since I brought up to date the Irish county records.¹ In order to answer some queries as to recent extensions of range, I have now abstracted the published and unpublished notes of the intervening quinquennial period (up till the end of 1912), and submit them herewith. The great activity in field-work which preceded the publication of "Irish Topographical Botany," and which continued till the publication of the 1901-1905 supplement,² has died away, and some of our most energetic workers are engaged on other branches of science; the distribution of Flowering Plants in Ireland is now tolerably thoroughly known—more thoroughly, for instance, as Mr. Colgan has shown,³ than in Great Britain. The period since 1901 (when "Irish Top. Bot." was published) has been fruitful, not only in the adding of many rare plants to the floras of the different county-divisions, but in the filling-up of blanks in the distribution of the commoner species. In 1901 I published⁴ a list of "Plant Records Wanted," showing, to the extent of over one thousand items, the more conspicuous blanks existing in the county lists. It is satisfactory to record that the work of the intervening twelve years has wiped out more than one-third of these—34 per cent., to be exact. During the same period, a total of about 1,140 new county records has been added to the distribution of Irish Flowering Plants as given in "Irish Topographical Botany."

¹Additions to "Irish Topographical Botany" in 1906-7. *Irish Nat.*, xvii., 28-37. 1908.

²Irish Topographical Botany: Supplement 1901-1905. *Proc. R. I. Acad.*, xxvi, B., 13-45. 1906.

³Notes on "Irish Topographical Botany," with some remarks on floral diversity. *Irish Nat.*, x., 233-240. 1901.

⁴*Irish Nat.*, x., 176-189.

To turn now to the period with which we are more directly concerned—the years 1908–1912, inclusive—a satisfactory advance has to be recorded. To the Irish list, 13 species (mostly critical plants) have to be added. These, with the numbers of the county-divisions from which they are recorded, are as follows:—

Rubus sulcatus Vest. 1.	Hieracium cymbifolium Pur-
Colemanni Blox., 2, 5.	chas, 9, 28.
adenanthus B. & G., 1, 2.	‡Atropa Belladonna L., 9, 35.
Griffithianus Rogers, 5.	Utricularia Bremii Heer, 1.
ochrodermis A. Ley, 15.	ochroleuca Hartm., 16, 27.
Hieracium britannicum F. J.	Rhinanthus major L., 8.
Hanb., 9, 28.	*Allium triquetrum L., 1, 4.
ciliatum Almq., 28.	‡oleraceum L., 39.

Of these *Atropa Belladonna* and *Allium triquetrum* are aliens now admitted as naturalized in more than one locality, according to *I. T. B.* standard, and *A. oleraceum* is a probably introduced species formerly recorded as *A. vineale*.

The new county-records include some notable extensions of range, such as *Pyrola minor* and *Orobanche rubra* from Kerry; *Cochlearia groenlandica* and *Bartsia viscosa* from West Galway; *Ceratophyllum demersum* from N.E. Galway; *Spiranthes Romanzoffiana* from Down; *Habenaria intacta* from W. Mayo; *Sisyrinchium angustifolium* from West Donegal and Antrim; *Leucojum aestivum* from Queen's Co., &c.; *Carex paradoxa*, *Glyceria festucaeformis*, *G. Fouchaudi*, and *Isoetes echinospora* from Clare.

It is satisfactory to record the re-discovery in certain divisions of plants long missing or very rare, such as *Vicia Orobus*, *Arctostaphylos Uva-ursi*, and *Pyrola secunda* in Antrim, *Cardamine amara* in Derry, *Matthiola incana* in Clare.

One or two rare plants which have been reported cannot be included in the present list, being either not naturalized or else planted where they occur: for instance, *Asplenium septentrionale* in Down (garden wall at Rowallane, *I. N.*, xxi., 150, 154), and *Typha angustifolia* in King's Co. (Birr Castle, where it proves to have been planted (R. A. Phillips)).

A few records are held over pending further information, as I, or others on whom I rely, are not satisfied as to their correctness. These are—

Caltha radicans, 15, 28 (*I. N.*, xviii., 209).

Cardamine amara, 1 (*Journ. Bot.*, xlvii., 227, 1909).

Inula crithmoides, 17 } (*Trans. Bot. Soc. Edinb.*, xxiii., 245-6,
Hottonia palustris, 16 } 1906).

Scrophularia umbrosa, 8 (*Journ. Bot.*, xlvii., 385, 1909).

Juncus trifidus, 1 (*Journ. Bot.*, xlvii., 227, 1909).

A few plants newly recorded from Ireland are omitted since it is at present doubtful if they can claim specific or subspecific rank in the sense in which these terms are used in "*Irish Topographical Botany.*" These include—

Viola epipsila.

Euphrasia fennica.

Taraxacum segregates.

Helleborine atroviridis.

Rhinanthus segregates.

Finally, there are a few records to be withdrawn, which have appeared in "*Irish Topographical Botany,*" or in its supplements, or subsequently. These are—

Ranunculus Lingua, 34 (*I. N.*, xvii., 36). Was *R. Flammula* (*I. N.*, xvii., 100).

Hieracium Schmidtii, 28, 29 (*I. T. B.*). These records of Barrington and Vowell's transferred to *H. anglicum* (*I. N.*, xviii., 83).

H. caesium* var. *Smithii, 28 (*I. T. B.*). Barrington and Vowell's record transferred to *H. ciliatum* var. *repandum* (*I. N.*, xviii., 83).

Allium vineale, 39 (*I. T. B.*) Adams has shown (*I. N.*, xviii., 111), that the Six-mile River plant is *A. oleraceum*. Probably the Shane's Castle record refers to the same species.

Elisma natans, 2, 9. Definitely recorded by Druce (*I. N.*, xix., 237), but Professor Glück, whose authority is quoted, tells me that the evidence for the inclusion of this plant in the Irish flora is still insufficient.

Tolypella glomerata, 15. Recorded by Druce (*I. N.*, xviii., 213), but subsequently withdrawn by him (*ibid.*, 250.)

I now proceed to list the new county-records, first under the county-divisions, adding references to published records (where the name of a journal does not precede the volume-number, the *Irish Naturalist* is understood); and secondly, according to systematic order, with the division-numbers appended.

NEW RECORDS UNDER COUNTY DIVISIONS.

1. KERRY SOUTH.—
Trifolium arvense, xvii., 51.
Rubus sulcatus, xvii., 51.
 incurvatus, xvii., 51.
 adenanthus, xvii., 52.
 Koehleri (*dasyphyllus*), xvii., 52.
 saxatilis, xvii., 52.
 **Cichorium Intybus*, xvii., 52.
2. KERRY NORTH.—
 †*Crambe maritima*, xvii., 51.
Rubus Colemanni, xvii., 52.
 adenanthus, xvii., 52.
4. CORK, MID.—
 **Allium triquetrum*, xix., 155.
5. CORK EAST.—
Rubus erythrinus, xvii., 55.
 Colemanni, xvii., 55.
8. LIMERICK.—
Rubus Lindleianus.
9. CLARE.—
Rosa involuta, xviii., 66.
Galium uliginosum, xviii., 67.
 **Crepis biennis*, xviii., 67.
Hieracium britannicum, xviii., 250.
 cymbifolium, xviii., 250.
 †*Atropa Belladonna*, xviii., 67.
 **Lycium barbarum*, xviii., 67.
 †*Mentha piperita*, xviii., 211.
Thymus Chamaedrys.
10. TIPPERARY NORTH.—
Rubus Lindleianus.
 rosaceus (*hystrix*), xvii., 56.
11. KILKENNY.—
Juncus acutus, xxi., 64.
12. WEXFORD.—
 †*Campanula Trachelium*.
13. CARLOW.—
 †*Linaria repens*.
14. QUEEN'S CO.—
Leucojum aestivum, *Proc. R.I.A.*,
 xxvii., B., 395.
- Pyrola minor*, xvii., 53.
Chlora perfoliata, xvii., 53.
 **Orobanche minor*, xxi., 163.
 rubra, xxi., 163.
Utricularia Bremii, xix., 237.
 **Allium triquetrum*, xix., 156.
Potamogeton crispus, xvii., 54.
 †*Poa nemoralis*, xvii., 54.
Rubus rudis, xvii., 52.
 **Sedum album*, xvii., 52.
Valeriana Mikanii, xvii., 50.¹
 †*Artemisia Absinthium*, xvii., 52.
Rhinanthus major, xix., 87.
Typha angustifolia, xviii., 39.
Lamium hybridum, xviii., 211.
Potamogeton decipiens, xviii., 67.
Eriophorum latifolium, xviii., 212.
Carex paradoxa, xviii., 68.
 divulsa, xviii., 68.
Glyceria festucaeformis, xviii., 68.
 Foucaudi, xviii., 68.
Agropyron pungens, xviii., 68.
Isoetes echinospora, xviii., 39.
 **Inula Helenium*, xviii., 39.
 †*Leucojum aestivum*, xxi., 244.

¹Recorded in *I. T. B.* Withdrawn in 1904 (*I. N.*, xiii., 78.) Since restored to the flora (*I. N.*, xvii., 50.)

15. GALWAY S.E. —
Ranunculus peltatus, xviii., 209.
Rubus villicaulis (Selmeri),
xvii., 55.
macrophyllus.
Rubus scaber, xvii., 56.
ochrodermis, xvii. 56.
Thymus Chamaedrys.
Potamogeton Zizii, xviii., 212
16. GALWAY W.—
Fumaria confusa, xxi., 235.
Cochlearia groenlandica, xx., 168.
Trifolium medium, xx., 168.
Rubus thyrsoideus, xx., 172.
Rubus dunensis, xx., 168.
*Carum Carui, xviii., 210.
Bartsia viscosa, xx., 169.
Utricularia ochroleuca, xix., 237.
Thymus Chamaedrys, xx., 170.
17. GALWAY N.E.—
Ceratophyllum demersum, xxi.,
179.
Lycopodium clavatum.
18. KING'S CO.—
†Leucojum aestivum, xxi., 244.
20. WICKLOW.—
Lamium hybridum.
Eriophorum latifolium, xviii., 228
21. DUBLIN.—
Hieracium Sommerfeltii, xviii., 250
22. MEATH.—
Rubia peregrina, xxi., 204.
23. WESTMEATH.—
Callitriche autumnalis, xxi., 26.
25. ROSCOMMON.—
Callitriche autumnalis, xxi., 26.
Hymenophyllum tunbridgense.
unilaterale.
26. MAYO EAST.—
Ranunculus scoticus, xviii., 36.
*Hesperis matronalis, xviii., 209.
*Arenaria tenuifolia, xviii., 210.
Hieracium anglicum, xviii., 33.
27. MAYO WEST.—
Elatine hexandra, xxi., 27.
Rhamnus Frangula, xviii., 35.
Filago minima, xviii., 36.
Arctium nemorosum, xxi., 238.
Utricularia ochroleuca, xxi., 27.
Thymus Chamaedrys, *Clare*
I. Survey, x., 26.
Ulmus montana, xxi., 27.
Habenaria intacta, xviii., 155.
Carex strigosa, xviii., 36.
28. SLIGO.—
*Hesperis matronalis, xviii., 209.
Hieracium britannicum, xviii.,
250.
Hieracium cymbifolium, xviii.,
250.
ciliatum, xviii., 83.
*Orobanche minor, xxi., 179.
29. LEITRIM.—
Polygonum viviparum, *Cyb.*
Hib., ed. i.
30. CAVAN.—
Rubus pulcherrimus, xxi., 237.
Lettii, xxi., 237.
*Sambucus Ebulus, xx., 163.
*Inula Helenium, xx., 163.
*Mimulus guttatus.
Thymus Chamaedrys.

31. LOUTH.—
Hieracium hypochaeroides,
xviii., 150.
33. FERMANAGH.—
*Leucojum aestivum, *Flora W.*
Ireland.
34. DONEGAL EAST.—
*Matricaria discoidea.
35. DONEGAL WEST.—
Potentilla procumbens, xix., 189.
Gentiana Amarella, xix., 188.
‡Atropa Belladonna, *Fl.*
Donegal.
Sisyrinchium angustifolium,
xviii., 222.
Juncus obtusifloras, xix., 189.
Chara polyacantha, xix., 188.
36. TYRONE.—
Arctium nemorosum, xxi., 238.
Stachys Betonica.
37. ARMAGH.—
‡Geranium columbinum.
Vicia sylvatica, *Proc. B.N.F.C.*,
1910-11, 348.
*Cichorium Intybus, xviii., 242.
*Mimulus guttatus, xviii., 242.
38. DOWN.—
‡Geranium pusillum, *Proc.*
B.N.F.C., 1908-9, 204.
Lathyrus palustris, xxi., 20.
Hieracium euprepes, xviii., 82.
‡Cuscuta Epithymum, xxi., 134
Orobanche rubra, xxi., 134.
Thymus Chamaedrys.
Spiranthes Romanzoffiana, xx.,
182.
Potamogeton decipiens, xxi.,
134.
39. ANTRIM.—
Fumaria densiflora, xxi., 235.
Draba incana, xix., 237.
Dipsacus sylvestris, *Proc.*
B.N.F.C., 1907-8, 11.
‡Sisyrinchium angustifolium,
xv., 187.
‡Allium oleraceum, xviii., 111.
*Elymus arenarius, xxi., 179.
40. LONDONDERRY.—
‡Draba muralis, xix., 135.
Epipactis palustris, xviii., 53.

NEW RECORDS ARRANGED SYSTEMATICALLY.

- Ranunculus peltatus, 15.
scoticus, 26.
Fumaria densiflora, 39.
confusa, 16.
‡Draba muralis, 40.
incana, 39.
Cochlearia groenlandica, 16.
*Hesperis matronalis, 26, 28.
Crambe maritima, ‡2.
*Arenaria tenuifolia, 26.
Elatine hexandra, 27.
‡Geranium pusillum, 38.
columbinum, ‡37.
Rhamnus Frangula, 27.
Trifolium medium, 16.
arvense, 1.

- Vicia sylvatica*, 37.
Lathyrus palustris, 38.
Rubus sulcatus, 1.
 incurvatus, 1.
 Lindleianus, 8, 10.
 erythrinus, 5.
 pulcherrimus, 30.
 villicaulis, 15 (*Selmeri*).
 thyrsoides, 16.
 macrophyllus, 15.
 Colemanni, 2, 5.
 hirtifolius, 5.
 Lettii, 30.
 adenanthus, 1, 2.
 rudis, 2.
 Griffithianus, 5.
 dunensis, 16.
 scaber, 15.
 rosaceus, 10 (*hystrix*).
 Koehleri, 1 (*dasyphyllus*).
 ochrodermis, 15.
 saxatilis, 1.
Potentilla procumbens, 35.
Rosa involuta, 9.
 **Sedum album*, 2.
Callitriche autumnalis, 23, 25.
 **Carum Carui*, 16.
 **Sambucus Ebulus*, 30.
Rubia peregrina, 22.
 †*Galium uliginosum*, 9.
Valeriana Mikanii, 2.
Filago minima, 27.
 **Inula Helenium*, 10, 30.
 **Matricaria discoidea*, 34.
 †*Artemisia Absinthium*, 2.
Arctium nemorosum, 27, 36.
 **Cichorium Intybus*, 1, 37.
 **Crepis biennis*, 9.
Hieracium anglicum, 26.
 Sommerfeltii, 21.
 hypochaeroides, 31.
 britannicum, 9, 28.
 ciliatum, 28.
Hieracium cymbifolium, 9, 28.
 euprepes, 38.
Campanula Trachelium, †12.
Pyrola minor, 1.
Chlora perfoliata, 1.
Gentiana Amarella, 35.
 †*Cuscuta Epithymum*, 38.
 **Atropa Belladonna*, 9, 35.¹
 **Lycium barbarum*, 9.
Linaria repens, †13.
Mimulus guttatus, 30, 37.
Rhinanthus major, 8.
Bartsia viscosa, 16.
Orobanche minor, 1, 28.
 rubra, 1, 38.
Utricularia ochroleuca, 16, 27.
 Bremii, 1.
 †*Mentha piperita*, 9.
Thymus Chamaedrys, 9, 15, 16, 27,
 30, 38.
Stachys Betonica, 36.
Lamium hybridum, 9, 20.
Polygonum viviparum, 29.
Ulmus montana, 27.
Ceratophyllum demersum, 17.
Spiranthes Romanzoffiana, 38.
Epipactis palustris, 40.
Habenaria intacta, 27.
Sisyrinchium angustifolium, 35, †39.
Leucojum aestivum, †10, 14, †18,
 †33.
 **Allium triquetrum*, 1, 4.
 †*oleraceum*, 39.
Juncus acutus, 11.
 obtusiflorus, 35.
Typha angustifolia, 8.
Potamogeton decipiens, 9, 38.
 Zizii, 15.
 crispus, 1.
Eriophorum latifolium, 9, 20.
Carex paradoxa, 9.
 divulsa, 9.
 strigosa, 27.

¹ Recorded from several other divisions (see *Cyb. Hib., l.c.*), but seems naturalized only in Clare and W. Donegal.

<i>Poa nemoralis</i> , ‡1.	<i>Hymenophyllum tunbridgense</i> , 25.
<i>Glyceria festucaeformis</i> , 9.	<i>unilaterale</i> , 25.
Foucaudi, 9.	<i>Lycopodium clavatum</i> , 17.
<i>Agropyron pungens</i> , 9.	<i>Isoetes echinospora</i> , 9.
<i>Elymus arenarius</i> , *39.	<i>Chara polyacantha</i> , 35.

PARTICULARS OF UNPUBLISHED RECORDS.

Geranium columbinum, L.

37. ARMAGH.—Rocky railway bank at south end of Adavoyle station, '08—P.

Rubus Lindleyanus, Lees.

8. LIMERICK.—Plentiful near Killaloe, '06—Druce *in litt.* Recorded but without definite division in *I. N.*, xvi., 148.

10. TIPPERARY N.—Margin of L. Derg, N.E. of Killaloe—Druce *in litt.*

R. macrophyllus, Wh. & N., aggr.

15. GALWAY S.E.—Near Portumna, '06—Druce *in litt.* Published but without definite division in *I. N.*, xvi., 148.

***Matricaria discoidea**, DC.

34. DONEGAL E.—Roadsides near Londonderry, '10—W. E. Hart!

Campanula Trachelium, L.

12. WEXFORD.—‡On new railway embankment at Kilmanock for the past two or three years, '12—G. E. H. Barrett-Hamilton!

Linaria repens, L.

13. CARLOW.—†A good colony on a bank near Fenagh House, '12 (Miss Allen)—D. R. Pack-Beresford!

***Mimulus guttatus**, DC.

30. CAVAN.—Between Blacklion and Dowra, in some quantity, '09—R. M. Barrington.

Thymus Chamaedrys, Fr.

9. CLARE.—Slieve Carran, '08—P.

15. GALWAY S.E.—Ardrahan, '08—P.

30. CAVAN.—Mount Nugent, 1896—P. (*teste* A. B. Jackson).

38. DOWN.—Killough, '02—P.

Stachys Betonica, Benth.

36. TYRONE.—Moygashel, 1½ mile south of Dungannon, '09—E. H. Harper!

Lamium hybridum, Vill.

26. WICKLOW.—In garden at Marlton, near Wicklow, '11—Miss Shillaker!

Hymenophyllum tunbridgense, Smith. }**H. unilaterale**, Bory. }

25. ROSCOMMON.—Kilronan Mountain, '10—W. N. Tetley.

Lycopodium clavatum, L.

17. GALWAY N.E.—One mile west of Ballyglunin station, '08—Mrs. Prescott-Decie.

NATURE RESERVES.

FORMATION OF A NEW SOCIETY.

[Reprinted, by permission, from *The Times* of Wednesday, December 18, 1912.]

In his recent address to the Zoological Section of the British Association at Dundee, Dr. Chalmers Mitchell made a strong appeal for the organized preservation of the world's fauna. "It is only by the deliberate and conscious interference of man," he said, "that the evil wrought by man has been arrested"; and, again, "Each generation is the guardian of the existing resources of the world; it has come into a great inheritance, but only as a trustee"—a trustee, that is to say, for generations that are to be. That the larger wild creatures are steadily disappearing from the face of the earth with the advance of civilization needs little demonstration. But coincidentally with the wholesale extermination of mammals there is in progress a no less disastrous process of destruction among the lesser creatures—birds, fishes, reptiles, insects, and plants—also of geological remains, and in almost every case this is the result of "the deliberate and conscious interference of man."

To arrest this destructive tendency serious consideration is being given to the subject in many countries. There exist in the United States "reserves" for the vanishing human races; in Norway, Sweden, and North Russia, the Lapps are efficiently protected; in Africa and New Zealand, as elsewhere in the British Dominions beyond the seas, large tracts of land have been fenced off, and laws enacted to prevent the traffic of alcohol and other goods harmful to the primitive races.

Elsewhere the duty of maintaining particular phases of human life and of preserving natural objects is recognized and performed by the community as a whole, acting through the State; but in the United Kingdom it has been left to private enterprise and private munificence to establish and finance such refuges and nature reserves as we actually possess. Something has been attempted, it is true, to check the wanton destruction of animal life, by various Acts of Parliament, the arrangement of "close" seasons, sanc-

tuaries, &c. ; and in the National Trust we have a body equipped with the necessary authority to take over and safeguard such gifts of land as may be made by public enterprise or private liberality. Much has already been accomplished in this direction by certain societies and individuals ; but all students and lovers of nature generally are now invited to combine in support of the Society for the Promotion of Nature Reserves.

This Society has recently been formed with the following objects :—

1. To collect and collate information as to areas of land in the United Kingdom which retain their primitive conditions and contain rare and local species liable to extinction owing to building, drainage, and disafforestation, or in consequence of the cupidity of collectors. All such information to be treated as strictly confidential.

2. To prepare a scheme showing which areas should be secured.

3. To obtain these areas and hand them over to the National Trust under such conditions as may be necessary.

4. To preserve for posterity as a national possession some part at least of our native land, its fauna, flora, and geological features.

5. To encourage the love of Nature, and to educate public opinion to a better knowledge of the value of Nature study.

The society exacts no subscription ; members are formally elected by invitation of the Executive Committee (marked with * below), and all interested are invited to communicate with the secretaries. The control of the society's affairs is in the hands of a representative council consisting at present of the following :—

President, the Right Hon. J. W. Lowther, M.P. Dr. I. Bayley Balfour, F.R.S., Sir Edward H. Busk, Sir Francis Darwin, F.R.S., Dr. F. D. Drewitt, *G. Claridge Druce, Professor J. Bretland Farmer, F.R.S., L. Fletcher, F.R.S., the Right Hon. Sir Edward Grey, Bt., K.G., M.P., the Right Hon. L. V. Harcourt, M.P., *Sir Robert Hunter, K.C.B., Lord Lucas, *E. G. B. Meade-Waldo, *the Hon. E. S.

Montagu, M.P., the Earl of Plymouth, C.B., Professor E. B. Poulton, F.R.S., Sir David Prain, F.R.S., *the Hon. N. C. Rothschild, *W. H. St. Quintin, Dr. R. F. Scharff, W. M. Webb. *Ex-officio* : Hon. Treasurer, *C. E. Fagan, I.S.O. ; Hon. Secretaries, *W. R. Ogilvie-Grant, and *the Hon. F. R. Henley.

The Trustees of the British Museum have kindly given permission to the committee to use the Natural History Museum, Cromwell-road, London, S.W., as the temporary address of the society.

To carry out the objects of the society prompt action must be taken, for year by year suitable areas become fewer ; and local plants and insects are found to have been extirpated when the acquisition of a few acres of land would have saved them. Such land is often unsuitable for other purposes ; an isolated spot on Government property, a piece of marshland, a bird-haunted cliff, or a stretch of wood and copse where the undergrowth has been allowed to follow its own devices are admirable subjects for nature reserves. Above all, it is essential that the land selected or reserved should as far as possible retain its primitive wildness. Such lands still exist in the United Kingdom, though each year they become more rare, and once deprived of their indigenous occupants they can never be restored to a natural state. It should be borne in mind that if in the course of time, owing to the growth of a city, or for some other reason, a nature reserve has ceased to serve its purpose, the ground would still be valuable as an open space.

On the Continent, as already observed, the importance of nature reserves has been widely recognized. In Germany, particularly, a large amount of land has been reclaimed, and in a recently published book, Herr H. Conwentz, Prussian State Commissioner for the Care of Natural Monuments, gives a detailed account of the work done in the several States of the Empire. Bavaria, more than a hundred years ago, bought up the Bamberg suburban woods, afterwards forbidding indiscriminate forestry, and ordering the foresters to preserve and catalogue the chief natural features. Later, a general committee composed

of delegates from the municipality and from local and artistic societies have been exceptionally successful in securing wild "parks" for rare plants. In Hessen and Oldenburg special attention has been paid to the preservation of primeval forest land ; while in the first years of the new century Prussia began to recognize the necessity of protecting nature reserves, and these have since been regularly registered and mapped, Parliament, the Education Department, and the Department of Agriculture and Domains acting conjointly to assist the movement. Thus, Memmert, an uninhabited island between Juist and Borkum in the German Ocean, is now reserved as a bird sanctuary, with a watcher to look after it during the breeding season ; and a tract of salt marsh near Artern perpetuates the plant association of the locality. Elsewhere spots especially favoured by wild nature have been similarly secured ; for example, the Prussian Government, the local authorities and societies, and private individuals have all co-operated to secure the forest district of Chorin, near Berlin, including fenland and a small lake, also a tract of forest in the Hartz Mountains. Saxony has followed this example. In Holland, the Naardermeer, in the south of the Zuider Zee, with its rich avifauna, is now effectively isolated, while in Sweden immense stretches of country in the far north and elsewhere have been closed to the collector, not before it was necessary. It is common knowledge that before the reservation of the magnificent Lapland country round the *Torneå Träsk*, and simultaneously with the opening of the Baltic-Atlantic railway, the district was ruthlessly over-collected by dealers and others ; in one summer a single individual is credited with the removal of 10,000 plants. In Hungary there are several reserved areas ; one of them at Puszta-Pészer, in the Pest Comitatus. In France good work has been done by the Forest Board in the protection of undergrowth and by some local prohibitions in the departments of Isère and Savoie on behalf of a few Alpine plants. Much the same may be said of Switzerland, where a few cantons have issued edicts against the destruction of Edelweiss and other "threatened"

flowers. In Belgium, though at present little has been done officially in the way of protection, the Royal Botanical Society has completed an admirable survey of desirable natural sites ("Pour la Protection de la Nature en Belgique." Jean Massart, 1912), and this work has aroused general public interest.

In the United States, where it is obvious that the conditions are entirely different as far as the acquisition of primitive land is concerned, the system of "National Parks" has been inaugurated, but unfortunately too late to save a large part of the indigenous fauna. Canada, Australia, New Zealand, and South Africa have set the Mother Country a splendid example of what can be done in this direction. In England, where space is limited, and the population numerous, a beginning has been made by the acquisition for the nation of a part of Wicken Fen, in Cambridgeshire, the shingle and salt marshes of Blakeney, in Norfolk (described in *The Times* of November 30), and the "Ruskin Reserve" near Oxford: all these retain their primitive character. Much more remains to be done, and it is hoped that the "Society for the Promotion of Nature Reserves" will meet with wide and sympathetic support.

OBITUARY.

HUGH LAMONT ORR.

On April 14th Hugh Lamont Orr passed away at Belfast, and his death removes one of the most active workers of the Belfast Naturalists' Field Club. A keen conchologist and entomologist, he was never so happy as when out on some mountain or glen-side, and few had a better knowledge of the best localities for field work in the north-east of Ireland. In the technical skill required in mounting and fitting up cases of natural history specimens he had few equals in this country, and his services and advice were always at the disposal of young naturalists. The Public Museum in Belfast often benefited by his donations. His skill as an amateur worker in wood and metal was often of great service at the annual conversaciones of the Field Club. He was an occasional contributor to this Journal and a subscriber from the first number. For some years he had been engaged on a list of the Wild Bees and Wasps of the North-east of Ireland,

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Guinea Baboon and a Leopard from Captain G. Furnell, a pair of Nigerian Lion Cubs from Lieutenant Ackland, a Malabar Squirrel from Dr. R. R. Leeper, and a Royal Python from Captain Lefroy. A number of animals have been acquired by purchase or deposit, including a pair of Pig-tailed Monkeys, two Red Howler Monkeys, a Black Agouti, Brazilian and Black Squirrels, a pair of Paradoxures, a Rasse, a pair of Persian Jackals, a pair of Ariel Toucans, and a pair of Flamingoes. A Tree Porcupine has been born in the Gardens, and the Black-necked Swans on the lake have reared two young birds.

The newly-arrived Nigerian lion-cubs have short hair of a rich brown colour, contrasting with the longer-haired, pale-coated specimens born in the Dublin Lion-house.

DUBLIN MICROSCOPICAL CLUB.

APRIL 9.—The Club met at Leinster House, J. H. WOODWORTH (President) in the Chair.

N. COLGAN exhibited living specimens of freshly hatched *Actaeonia Cocksii*, together with living specimens of the adult animal and of the closely allied *Limapontia capitata*. Eggs of both species were also shown, those of *Actaeonia* being in an advanced stage of development, with the eyes and body-pigment of the embryos clearly visible through the shell. The young *Actaeoniae* were about 1 mm. in length and at this early stage, with the characteristic tentacular processes as yet quite undeveloped, were very similar in aspect to *Limapontia*. The egg-clusters exhibited were of interest as showing the aberrant nature of the development in the genus *Actaeonia*, which alone amongst the opisthobranch mollusca, as Pelseener has shewn, dispenses with the free veliger stage. The young *Actaeoniae*, just 4 days old, had been hatched out from an egg cluster taken in a half-tide pool at Bullock, Dublin Bay, on the 20th March last.

R. SOUTHERN showed a specimen of *Grania maricola*, an oligochaete worm obtained in the course of the Clare Island Survey. The remarkable character of this species necessitate the creation of a new genus, named after the famous chieftainess of Clare Island. The genus is characterised by the peculiar arrangement and structure of the setae, which are absent in the anterior region of the body. This species is also noteworthy as being the first oligochaete obtained below low-water mark. It was dredged in 24 fathoms in Clew Bay, and has since been found in 20 fathoms in Dingle Bay. A full description is published in the *Proceedings* of the Royal Irish Academy (Clare Island Survey), vol. xxxi.

J. N. HALBERT exhibited specimens of an interesting kind of mite which was found adhering to the bodies of centipedes from Trinidad. The mite

belongs to the family Gamasidae and has recently been described by Dr. Ivor Trägårdh under the name of *Discomegistus pectinatus* (*Archiv für Zoologi*, vii.). The original specimens, from which the species was described, were also obtained from a large centipede (*Scolopendra gigantea*) from the same locality. The species shows some interesting structures which are evidently adaptations enabling it to cling securely to the smooth bodies of the centipedes on which it lives.

BELFAST NATURALISTS' FIELD CLUB.

APRIL 15.—The fiftieth annual meeting was held in the Old Museum. In the unavoidable absence of the President (Rev. Canon Lett), R. J. WELCH presided.

Before proceeding to the business of the meeting, the Chairman moved a vote of condolence to the relatives of the late Hugh Lamont Orr, who was a warm supporter of the Club, and for many years a very active member. The motion was passed, by the members standing, in silence.

The Honorary Secretary (A. W. STELFOX) read the annual report, which contained the following:—A considerable amount of active field work has been accomplished by members in botany, zoology, geology, and archaeology. A meeting to celebrate the fiftieth anniversary of the Club's foundation will be held on the 10th day of next month, at which delegates representing many of the great natural history societies of the United Kingdom will be present. The Committee rejoice that of the sixty-nine persons who signed the document requesting the formation of the Club in 1863 six are still with us, and hope to be present at the celebration meeting. The membership on 31st March, 1913, stands at 381. The winter session was opened by the usual conversazione, held in the Assembly Buildings on 31st October, at which 310 persons were present. The winter meetings were held in the Museum, College Square, North, the Club having again been granted the use of their rooms on the old terms by the Belfast Corporation. F. Balfour-Browne, M.A. represented the Club at the British Association Conference of Delegates, held at Dundee in September, 1912, and has submitted his report, which will be found in the Proceedings. The Committee are glad to be able to announce that there has been fair competition for some of the prizes offered to pupils attending secondary schools in Ulster. The Committee regret, however, that no junior member of the Club was sufficiently energetic to compete for the prizes offered by the Chairman of the junior section. For hospitality received by members of the Club, and for permission to visit their estates, the Committee desire to place on record their thanks to Lord Rossmore, Lord Roden, Sir Frederic Lambert, of Beau Parc; Mr. W. J. D. Walker, C.B., of Drogheda; and Mr. H. Armytage-Moore, J.P., of Rowallane, County Down. The Committee desire to thank also the superintendents of the various railway companies for the kind attention and facilities afforded in the summer excursions, the Press for publishing reports of the Club's meetings, and the public bodies and kindred societies, who have favoured the Club with their

publications during the past year. The Committee beg to draw attention to the resignation of Mr. W. H. Phillips, and desire to thank him for his devoted service in the past. Towards the middle of the first year of the Club's existence, in 1863, Mr. Phillips took on the duties of treasurer, which position was left vacant by the death of A. F. Herdman. In 1870 Mr. Phillips resigned, but in 1891 he was again elected treasurer, a position which he has therefore occupied for twenty-eight out of the fifty years during which the Club has been in existence.

W. H. Phillips read his statement of accounts, the librarian (S. Weir) his report for the past year, and the following honorary secretaries gave the reports of their respective sections:—N. Carrothers, Miss M. K. Andrews, N. H. Foster, J. A. S. Stendall, and Robert May.

In moving the adoption of these reports, the Chairman expressed the gratitude the Club felt towards Mr. Phillips for the services he had rendered it, and his remarks were endorsed by William Gray, M.R.I.A., who seconded the motion. Mr. Welch also drew the attention of all members to the coming celebrations of the fiftieth anniversary.

The following officers were elected for 1913-14:—President, Rev. Canon Lett; Vice-President, R. Lloyd Praeger; Librarian, Sylvanus Wear; Treasurer, N. H. Foster; Secretaries, A. W. Stelfox and Miss M. D. Mitchell.

Suggestions for places to be visited during the summer session were received, and the business of the meeting was then brought to a conclusion.

DUBLIN NATURALISTS' FIELD CLUB.

MARCH 4TH.—W. F. GUNN (President) in the chair. R. LI. PRAEGER opened a discussion on "What do we mean by a Native Species?" He drew attention to the importance of the question from a scientific point of view. In the study of the distribution of plants and animals naturalists were endeavouring to restore the old aboriginal fauna and flora of the country. The main thing which altered the fauna and flora of Europe was the breaking down of the great European forest belt which let loose the Mediterranean fauna and flora northward and westward. There was, he thought, a great tendency when one found a plant to make it as native as possible. Mr. Praeger defined as native the plant naturally growing in a natural habitat to which it has been carried by natural means.

N. Colgan said there was no single word which would describe the native plant. He objected to the word "nativity," for it was altogether out of place, while "aboriginality" was abominable.

Messrs. W. F. Gunn, W. de V. Kane, R. M. Barrington, C. B. Moffat, and Professor J. Bayley Butler also took part in the discussion.

The following exhibits were on view:—A representative collection of the seeds of the Family Leguminosæ: W. F. Gunn. Some forms of Plant Stems: R. Li. Praeger. Miss K. E. Beveridge and Miss Barnes were elected members.

APRIL 8.—R. LI. PRAEGER, M.R.I.A., in the chair.

The programme of the meeting consisted of a number of exhibits.

W. F. GUNN had on view a microscopic preparation of anthers of the Mallow in which the pollen grains were beginning to escape.

R. LI. PRAEGER, *Ulex strictus*, Mackay, a curious "sport" of the Common Whin, first discovered on Lord Londonderry's estate in Co. Down, and was for some time thought to be a new species. It has, however, since been proved that it does not always breed true from seed, but shows a tendency to revert to the common type. It can be grown from cuttings without any difficulty.

J. N. HALBERT, a collection of Irish Dragonflies, of which he explained the distribution and habits.

W. B. WRIGHT, a series of photographs illustrating the glacial geology of County Kerry. Mr. Wright explained how, in the valley of the Kenmare River, the shore lines of old glacial barrier lakes had been discovered comparable to the famous "Parallel Roads of Glenroy" in Inverness-shire.

C. M. SELBIE, B.Sc., a Decapod Crustacean new to Irish waters; *Munidopsis curvirostris*, Whit.

ALEXANDER WILLIAMS, R.H.A., some specimens of copper ore from Beaparc copper mine.

Specimens of Lichens collected on the Howth excursion on 5th April were also exhibited.

Mrs. Palmieri and Miss Sweeny were elected members.

NOTES.

BOTANY.

Trifolium filiforme in West Mayo.

The Earl of Gainsborough has sent me a specimen of *Trifolium filiforme* gathered on a wall between Mallaranny Hotel and the new chapel. In response to enquiries, he searched for more, but could not find additional specimens. Perhaps some botanist visiting Mallaranny this season will watch for the plant. Though usually introduced with lawn grass-seed it is undoubtedly native in certain of its Irish stations, and this plant may have come from a native station. I did not notice it last August in the lawns around the hotel.

R. LLOYD PRAEGER.

Dublin.

The Cowslip in County Down.

Driving from Rostrevor to Warrenpoint last April, I noticed Cowslips flowering in several old pasture fields by the roadside. Though recorded from various stations in the north-east, "Wood at Rostrevor: William Gray," was the only record which S. A. Stewart admitted to the *Flora of the North-east of Ireland*, adding "possibly introduced at Rostrevor, but this seems the only station in our district where it is probably native."

Cowslips do not grow naturally in woods, and what evidence Mr. Stewart had in favour of this station I do not know; but when he and I failed to see the plant anywhere about Rostrevor during our survey of the Mourne Mountains, he wrote:—"Must be removed from the list of native plants" (*I. N.*, iii., 54, 1894). In the following year, I quoted an instance of Cowslips having been spread over an old meadow in Antrim by means of irrigating water which had flowed through a stack-yard where hay containing the remains of planted Cowslips had been stored (*Suppl. Flora N. E. Ireland*); and I was inclined to discount the occurrence of the plant as a native in the North-east. In connection with its occurrence near Rostrevor, Miss Angela Ross-of-Bladensburg, who knows the district well, kindly writes:—"There are very few Cowslips about here. I have only found them in the fields going to Warrenpoint and at Ballyedmond beyond Killowen. There are a few here (at Fairy Hill, Rostrevor) under beech trees near the garden. I have never seen any in really wild places nor further inland. They grow near houses beside Primroses in grass that is usually kept for hay—there are always Daffodils near. When we first came here there were only one or two little plants; now there are several, but they do not seem to increase quickly. I am sure they are not native." The evidence seems against the Cowslip being indigenous in Down; but we must not forget that its natural habitat is just those lowland grass-lands which are seized upon by man for lawns and pastures, where it persists in spite of, and not because of, man's presence. So we cannot be sure that we are not dealing with a relict plant rather than an introduction. As an apparently native species the Cowslip occurs mainly on limestone, and on the east coast extends northward as far as Louth, but does not appear to cross the mountain barrier that stretches from Carlingford to Slieve Gullion. Further west it follows the limestone as far north as Lough Sheelin and Lower Lough Erne. Its occurrence as a native except on calcareous soils appears to be very rare.

R. LLOYD PRAEGER.

Dublin.

ZOOLOGY.

Bees and Flowers.

I read with amusement in the April number (*supra*, p. 65) Mr. Moffat's "rule of the bee, especially the Honey Bee, against mixing the honey or pollen of different species of plants." I do not question the correctness of his observation on the bed of wall-flowers; nor his later observations on the curious mixing of honey from *Lathyrus* and *Ajuga*, but the "rule" has very many exceptions. Except when one flower is in such abundance that a load is easily gathered, the Honey-bee wanders freely to any plant in blossom. This is the first fine day since I read the article. I have, for ten minutes or so, watched four honey-bees in succession. They visited (a) white single *Arabis*; (b) white double *Arabis*; (c) purple

Aubretia ; and (d) blue forget-me-not : One comes from (e) a gooseberry bush with about a half load of honey ; one visited also a few blossoms of (f) yellow Alyssum. They did not visit these in any particular order, all showed a preference for forget-me-not, which seemed to yield nothing. " Bees do nothing invariably."

ALEX. H. DELAP.

Valentia, Co. Kerry.

A "Slow-Worm" near Ballyshannon.

This day week a man found on the bank of the River Erne close to the town of Ballyshannon, a live specimen of the "Blindworm" (*Anguis fragilis*). It was in long grass close to the river bank. The man thought it was a snake, and killed it ; it was shown to me as such, when I recognised it as the above. This is the first time such was observed, and it appears to be rare in Ireland (if ever observed before), though common enough in England.

H. ALLINGHAM.

Ballyshannon.

[The Slow-worm is not regarded as indigenous in Ireland, and as specimens are often kept in vivaria, Mr. Allingham's specimen was, in all probability, introduced.—Ed.]

Snakes introduced into County Down.

The note on "Adders and Toads in Co. Down," in the *Irish Naturalist* for April, reminds me of an item in "The Book of Days," by R. Chambers, published in 1863. Under the date of March the seventeenth is the circumstantial account which I quote in full. Perhaps this is the same experiment as that mentioned by Dr. Bryce, though neither adders nor toads appear.

W. E. PRAEGER.

Kalamazoo College, Michigan.

"In 1831, Mr. James Cleland, an Irish gentleman, being curious to ascertain whether the climate or soil of Ireland was naturally destructive to the serpent tribe, purchased half-a-dozen of the common harmless English snake (*Natrix torquata*), in Covent Garden market in London. Bringing them to Ireland, he turned them out in his garden at Rath-gael, in the County of Down ; and in a week afterwards one of them was killed at Milecross, about three miles distant. The persons into whose hands this strange monster fell, had not the slightest suspicion that it was a snake, but, considering it a curious kind of eel, they took it to Dr. J. L. Drummond, a celebrated Irish naturalist, who at once pronounced the animal to be a reptile and not a fish. The idea of a 'rale living sarpint' having been killed within a short distance of the very burial place of St. Patrick, caused an extraordinary sensation of alarm among the country

people. The most absurd rumours were freely circulated and credited. One far-seeing clergyman preached a sermon, in which he cited this unfortunate snake as a token of the immediate coming of the millennium; while another saw in it a type of the approach of the cholera morbus. Old prophecies were raked up, and all parties and sects, for once, united in believing that the snake foreshadowed 'the beginning of the end' though they very widely differed as to what that end was to be. Some more practically-minded persons, however, subscribed a considerable sum of money, which they offered in rewards for the destruction of any other snakes that might be found in the district. And three more snakes were not long afterwards killed, within a few miles of the garden where they were liberated. The remaining two snakes were never very clearly accounted for; but no doubt they also fell victims to the reward. The writer, who resided in that part of the country at the time, well remembers the wild rumours among the more illiterate classes, on the appearance of those snakes; and the bitter feelings of angry indignation expressed against those who dared to bring them to Ireland."

Snowy Owl on Tory Island.

On April 5th I received from Tory Island, Donegal, a fine specimen (male) of the Snowy Owl (*Nyctea scandiaca*). Measurement of wings from tip to tip of longest primaries, $57\frac{1}{2}$ inches—or two inches short of 5 feet; weight, 3 lbs. 9 oz. There are about thirty Irish records in the 19th century, and a few since—the great bulk of them being, as might be expected, from the northern and western counties, especially Mayo. Looking over the index to the *Irish Naturalist* which I published in 1911, I find under "Snowy Owl" that "vol. xviii., p. 106" should be vol. xviii., p. 160. I also notice that on p. 100 of the same volume Mr. Ussher gives several records of this species, Montagu's Harrier, Rough-legged Buzzard, and Greenland Falcon, none of which appear in the index to that volume under the names of these birds, but the communication is simply indexed under "Ussher" and under "Birds." This defect in the original index is of course responsible for a similar imperfection in mine, which purports to be only an index to the *indices* of eighteen volumes.

RICHARD M. BARRINGTON.

Fassaroe, Bray.

Extermination of the Capercaillie.

In the review of Parts IX. and X. of the "British Bird Book" (*antea* p. 55) it is stated that "Mr. Jourdain, by an obvious slip, states that the Capercaillie was exterminated in Scotland and Ireland, during the second half of the nineteenth century." Permit me to point out that the mistake in question was not made by me, and that on p. 2 I have distinctly stated that "in Scotland and Ireland it survived till the latter half of the eighteenth century, but then became extinct."

F. C. R. JOURDAIN.

Clifton, Derbyshire.

Stone Curlew and Ivory Gull in County Cork.

We received a Stone Curlew shot by Col. Morris at Castletownshend, Co. Cork, on February 24th. The bird was an adult female, in fine plumage, and was feeding with a small flock of Curlew in some fields. This is we understand the first occurrence in the county. The specimen is being presented by the owner (Sir Edgar Coghill) to the University College Museum, Cork. Another very rare visitor has also been obtained viz., the Ivory Gull. Unfortunately this fine specimen, an adult male, was apparently attacked by a Peregrine, and the breast, wing and leg were the only parts left. It was picked up on the Marina, Cork, where it was apparently dropped by the Peregrine in flight or from a tree, on February 16th. The plumage and skin were quite fresh, and had portions of flesh, &c., adhering. We believe this is the third record of the Ivory Gull in Ireland. The recent severe weather no doubt account for these visitors, as well as an abnormal number of Great Northern Divers (some in summer plumage) recently got off this coast. Both the above specimens were seen by Mr. Robert Warren and Mr. R. J. Ussher.

ROHU & SONS.

Cork.

Ivory Gull in County Donegal.

A beautiful specimen of the Ivory Gull (*Pagophela eburnea*) (female) in immature plumage was shot at Teelin, near Carrick, Co. Donegal, on March 25th, and forwarded to me in the flesh. This is the fifth Irish record, and the second this year. All were obtained in the early spring on our S. or W. coasts. The comparatively small feet with rough, thick scalloped webs and Skua-like claws were remarkable, but the web mentioned in Saunders' "Manual," between the tarsus and hind toe was not well marked, as stated by him.

RICHARD M. BARRINGTON.

Fassaroe, Bray.

Gannets on the Skelligs in 1700.

In the "Birds of Ireland," and in Mr. Ussher's "List of Irish Birds, 1908," (to be had at the National Museum, Dublin), he mentions Smith's record of 1750 as the earliest known to him of the Gannet colony on the Skelligs. There is, however, in Brady's Records of Cork, Cloyne and Ross published by Alexander Thom, Dublin, in 1863, an account of a tour of Bishop Dive Downes, in which, under the heading of Kilmore Parish, and dated 3rd June, 1700, the following occurs:—"We saw also from thence (*i.e.*, Mt. Gabriel), Ballineskellix Islands in Kerry. On the Skellix the gannet, as big as a goose, breeds." That is fifty years earlier than the date mentioned by Mr. Ussher, and on my drawing his attention to

this, he requests me to publish this notice, as the record does not seem to be known to ornithologists and shows that the Gannet colony on the Skelligs has been established over 200 years.

W. M. ABBOTT.

Fermoy.

The Proportion in Numbers of White and Pied Wagtails observed on Migration at the Tuskar Light-Station.

Before I took up the study of bird-migration at the Tuskar light-station I was under the impression that the Pied Wagtail occurred in much larger numbers in Ireland during the migration seasons than did the White Wagtail. However, in examining the specimens which I collected, twenty-one in all, I found that over two-thirds were White Wagtails, the number being fifteen, and only six Pied Wagtails.

In the autumn of 1911 I obtained two White and one Pied, in the spring of 1912 three Pied and two White. (I should have been able to obtain a great many more White had I remained longer, for the species was only just beginning to arrive when I had to go.) In the autumn of 1912 I obtained eleven White and two Pied. Of the two species the Pied Wagtails appeared earlier in the spring, and later in the autumn I am deeply indebted to Mr. Eagle Clarke for his careful examination of the skins of these birds. Many were in immature garb, a phase of plumage when the two species are closely alike, and it requires a practised eye to distinguish them.

C. J. PATTEN.

University, Sheffield.

The Irish Wild Cat.

I do not think any evidence is likely to be obtained which will satisfy both Dr. Scharff and Mr. Warren as to the real character of the cat found by Mr. Ussher in the Irish caves. It would be well, however, to describe in plain language, as far as possible, for the benefit of sportsmen, game-keepers, and trappers, how they are to distinguish the descendants of the Irish Cave Cat from the descendants of the introduced Domestic Cat which has gone wild.

I entirely agree with Mr. Warren as to the large size attained by "wild tame cats." Fright and agony combined render them dangerous customers in a rabbit trap when held merely by the hind toe.

Possibly an appeal in the trapping season, if made by Dr. Scharff through the public press, would procure for him some gigantic specimens of these well known "wild tame" cats.

RICHARD M. BARRINGTON.

Fassaroe, Bray.

WILD CATS IN IRELAND.

BY J. A. HARVIE-BROWN, F.R.S.E.

I observe the question discussed in the pages of the *Irish Naturalist* as regards the occurrence of the true Wild Cat in Ireland within historic times, and I am fairly well acquainted with all previous accounts. I thoroughly agree with Mr. Robert Warren's views (*supra* pp. 94-6) as regards the matter, and with all he says against the imperfect evidence adduced in favour of its presence in Ireland at any time during, say, the last hundred years. Further, I have had very good and abundant cause to support him in his judgment that "Stories of Wild Cats by the country people should not be credited as referring to the true Wild Cat, but to the Domestic Cat run wild, and bred wild," &c., &c., and this in spite of Dr. Scharff's criticism, of such an opinion of the "veracity of country people" being "severe." As most of us who have lived a large portion of our lives—portions too, actively employed in observation, and the disentanglement of current statements by our Highland informants—know well, what Mr. Warren says is quite to the point; that such are "very unreliable," and require close cross-questioning of often prolonged and even tedious nature. Frequently if the investigator is a stranger, or visits a locality for the first time, and proceeds with his enquiries from a man whom he does not know, and who does not know him—very often indeed the native says what he thinks will give pleasure, without much regard to the facts. Especially should leading questions be avoided! I have always found it necessary first to know my man, and be known to him, before crediting all I hear. After that the difficulty is less. Likewise, the imperfect knowledge of the Sassenach language which many Highlanders have is a great stumbling block, especially to the Sassenach¹ who comes from south of the Border, as well as to his informant.

¹ By "Sassenach" I do not mean, however, the Englishman, for we lowland "Scotch" are just Sassenachs too—but the further removed the Sassenach may be from the Border—of course I refer to our Scottish Borders—the more difficult it will prove—as it has proved—for the in-

I think it has been stated that the skull or bones of a Wild Cat² have been discovered in some one or more of the wonderful bone-caves of Ireland, but I do not propose going into that part of the question here, as that phase has no particular bearing upon the more recent proofs—or statements—regarding the occurrence of the species within historic times.

Suffice it to say, that I cannot accept any of the proofs—so-called—of any occurrence of true Wild Cats—well, say, since Thompson wrote his valuable work (*i.e.*, without referring back to earlier writers such as Gerald Boate or even Wilde)—nor the statements of the “oldest inhabitant.” As already said, such statements are often quite imaginative, and are often dressed up to please the hearer; or may arise from an imperfect appreciation of the English questioning.

The fact remains that while the Marten Cat is still found in Ireland, it has long since, and within historic time, become extinct in all the Hebrides south of the Sound of Harris, and has lately also ceased to exist even in its last refuges in the mountainous portions of Harris and Lewis. The Wild Cat has not been known anywhere in the Outer Isles at any time within our ken. And when that is considered along with the imperfect evidence of its recent presence in Ireland, it must be evident surely, that at least more definite and abundant proof is required of that before any such “wild” statements can be accepted by those who make a special study of distribution and dispersal, to say nothing of dominancy and migrations.

Dunipace, Larbert, Scotland.

vestigator and his informant, the one ignorant of Gaelic, and the other equally so—or only with imperfect knowledge—of the English language, to understand one another. The language of “Yea” and “Nay” is not sufficient to clear up doubts.

²[Not the Wild Cat of Scotland, but *Felis ocreata* of the Mediterranean Region. See R. F. Scharff in *Irish Naturalist*, xiv., 1905, p. 79; *Proc. R. I. Acad.*, vol. xxvi., 1906, pp. 1-12 and *infra* p. 127.—EDS.]

ON THE SUPPOSED OCCURRENCE OF THE WILD CAT IN IRELAND.

BY R. F. SCHARFF, PH.D.

IN the June number of the *Irish Naturalist* (*supra*, p. 124) Mr. Barrington suggests that I should describe in plain language how the descendants of the Irish Cave Cat, if such still exist, are to be distinguished from the Domestic Cats that have gone wild. It is not an easy task for me to describe what I have not seen, and yet it is reasonable to enquire what I expect the Irish Wild Cat to look like.

Mr. Warren's repeated references to *Felis catus* (*supra* pp. 94-6) imply that he is thinking of a cat with a bushy tail. It is natural enough that we should be looking for a bushy tail among the supposed Irish Wild Cats because the Scottish Wild Cat possesses that feature. But I urged already eight years ago¹ that the undoubtedly wild Irish Cave Cat probably had a pointed tail. I also showed that the teeth of this cat, which had been found fossil in the caves of County Clare are not like those of the Scottish Wild Cat. The teeth resemble those of the Wild Cat of Sardinia and Africa. If the Irish Wild Cat still occurs in outlying parts of Mayo and Donegal we can recognise it by its teeth. The back cheek teeth of both upper and lower jaw are considerably larger in the fossil jaws of the Irish Cave Cat than in the Domestic Cat.

We possess in the National Museum a skull of an enormous cat which was killed in a rabbit-warren near Greystones, and another skull of a huge fierce cat which terrorised the birds in the Zoological Gardens for years and was finally shot. Both of these specimens had the back teeth of an ordinary Domestic Cat, and were therefore not truly "Wild Cats."

Hence, the trapper and sportsman should examine the teeth of the cats if he wants to find out whether they are Domestic Cats gone wild, or genuine Wild Cats. I must

¹ *Irish Naturalist*, vol. xiv., 1905, p. 79.

own that during the life-time of the captured specimen this process of examination may attract few, if any, sportsmen. Even dead cats are not pleasant to handle, and I would suggest that any cats infesting rabbit-warrens in the more remote parts of Ireland, which have to be killed, should be immediately forwarded to me for examination. The postage and incidental expenses will be refunded, if desired.

I believe the Irish Wild Cat much resembled the ordinary domestic tabby cat, that it had a pointed tail which was black at the tip, that it was grey in colour with dark transverse markings on the limbs, and less so on the body. It is quite possible, as I mentioned before, that a true Wild Cat still exists in Ireland, and I trust the readers of the *Irish Naturalist* will help me to solve this problem.

National Museum, Dublin.

NOTES ON IRISH MYRIAPODA.

BY REV. W. F. JOHNSON, M.A., F.E.S.

So little is known about Irish Myriapoda that I make no apology for recording the very commonest species. Thirty-six species have up to the present been recorded as occurring in Ireland, to these I am able to add seven, and these I have marked with an asterisk in the list which follows. Two genera of Myriapoda are only too well known to gardeners, viz., the long narrow, yellow centipede, *Geophilus*, and the round black millipede, *Julus*. Both are injurious to plants, attacking the roots, and war is consequently waged upon them. Another genus, however, which is pretty common about gardens is not injurious, being carnivorous; this is *Lithobius*, the broad flat centipede. I shall be much obliged for specimens of Myriapoda of any kind. They can be sent either in spirits of wine or in moss in a tin box. Of the localities mentioned below—Dromantine is in the County Down about three miles from this. Acton Wood, Demoan Wood and the canal bank are all near Poyntzpass, and in County Armagh.

Unless otherwise stated the captures are my own. I have used the following abbreviations for names of collectors :—

N.H.F.	=	Nevin H. Foster.
H.L.O.	=	the late H. Lamont Orr.
A.W.S.	=	A. W. Stelfox.

and I beg to thank them for their kind assistance. I have followed Dr. Latzel in the arrangement of the genera.

I am much indebted to Mr. H. W. Brölemann for kind help with two or three species about which I was doubtful.

CHILOPODA.

Lithobius variegatus, Leach.—Lough Dhu, Sallagh Braes, Co. Antrim, at 1,000 feet elevation (A.W.S.). Coolmore, Co. Donegal, under stones, in September. Acton Wood, in moss, in November and December. Demoan Wood, in moss, in January. Dromantine, in moss, in January. Poyntzpass, in rotten wood, in May.

L. forficatus, Linné.—Coolmore, under stones, in September. Poyntzpass, in garden, under stones and pieces of wood, very common.

L. melanops, Newport (*glabratus*, C. Koch).—Coolmore, under stones, in September. Poyntzpass, under bark of *Pinus sylvestris*, in January.

***L. agilis**, C. Koch.—Coolmore, under stones, in September. Acton Wood, in moss, in December. I took a female which had three genital spurs on the right side and two on the left. In the ordinary form there are two on each side.

***L. borealis**, Meinert.—Coolmore, under stones, in September. Acton Wood, in moss, in November and December. Demoan Wood, in moss, in January. I took a female in which the genital spurs instead of being of equal length had one much larger and longer than the other, and had the genital claw bilobed instead of trilobed.

***L. crassipes**, L. Koch.—Acton Wood, in moss, in November. Poyntzpass, in garden, in May. One specimen had the left antenna 21-jointed, and the right 25-jointed.

Geophilus carpophagus, Leach (*condylogaster*, Latzel).—Delamere, Belfast (A.W.S.). Poyntzpass, in garden, much too common.

G. longicornis, Leach (*flavipes*, De Geer).—Poyntzpass, in garden, in March and May.

Linotaenia crassipes, C. Koch.—Poyntzpass, in garden, in February.

Schendyla nemorensis, C. Koch.—Poyntzpass, in garden, in February.

DIPLOPODA.

Glomeris marginata, Villers.—Acton Wood, in moss, in November. Poyntzpass, under stone on roadside, in April. The only species of *Glomeris* hitherto found in the British Islands. Dr. Latzel enumerates fourteen species.

Brachydesmus superus, Latzel.—Coolmore, in September. Ballyworkan, near Portadown, under logs in a bog, in July. Poyntzpass, in garden, &c., in March and May. Acton Wood, in moss, in November. Demoan Wood and Dromantine, in moss, in January.

Polydesmus complanatus, Linné.—Belfast (H.L.O.). Acton Wood, in moss, in December.

***P. edentulus**, C. Koch.—Belfast (H.L.O.). Canal bank, under stones, in June. Poyntzpass, in garden, in April.

Atractosoma polydesmoides, Leach (*bohemicum*, Rosicky).—Coolmore, in September. Poyntzpass, in garden, in October. The Scalp, Co. Dublin, in January (A.W.S.).

Blaniulus pulchellus, Leach (*venustus* Meinert).—Acton Wood, in moss, in November. Poyntzpass, under bark of *Pinus sylvestris* in December, and in rotting wood in May. Dromantine, in moss, in January.

I have followed Dr. Latzel in the synonymy of this species. Dr. Leach places his *I. pulchellus* between *I. punctatus*, Leach, and *I. pusillus*, Leach, both of which have eyes, and in his definition of the genus, says:—"Oculi distincti," *vide* Leach, *Zoological Miscellany*, vol. iii., 1817:—"The characters of the genera of the Class Myriapoda, with descriptions of some species."

B. fuscus, Am. Stein.—Acton Wood, in moss, in December. Demoan Wood, in moss, in January.

Iulus luscus, Meinert.—Coolmore, in September. Poyntzpass, in garden, in April.

***I. luridus**, C. Koch.—Acton Wood, in moss, in November. Canal bank, under stones, in June. Poyntzpass, under bark, May and June.

I. fallax, Meinert.—Navan Fort, Armagh (N.H.F.). Coolmore, in September. Acton Wood, in moss, in November. Dromantine, in moss, in January. Canal bank, under stones, in June. Poyntzpass, in garden, &c., March, June, November. A common and variable species.

***I. scandinavicus**, Latzel.—Acton Wood, in moss, in November. Dromantine, in moss, in January.

I. sabulosus, Linné.—Navan Fort, Armagh, in June (N.H.F.).

I. albipes, C. Koch.—Ballyworkan, near Portadown, under logs in bog, in July. Poyntzpass, in garden, February, March, June, in a beehive in March. What it was doing here I cannot imagine. It was on the floor of a straw skep, and the bees did not seem to mind its presence. One of our commonest and largest species. This species has been identified with *I. niger*, Leach, but Mr. Brölemann says that the latter name has been so often used and misused that until Leach's types are examined it is impossible to know what species is meant by his name. I have, therefore, used C. Koch's name which appears to be accepted for this species on the Continent.

Poyntzpass, Co. Armagh.

NEW RECORDS OF IRISH MYRIAPODS.

BY C. M. SELBIE, B.SC.

In a recent paper on the Myriapods of Clare Island¹ there was published, in addition to the list of species found on the island, a summary of all the records of Irish species contained in earlier papers on this group.

In the National Museum there is a considerable amount of myriapod material from various parts of Ireland, and I have examined this, and give here the names of the species identified, and the localities from which they came.

The Clare Island paper then, together with this list, gives a complete summary of Irish Myriapod records as at present known. The list contains the names of two species new to Ireland, *Lithobius crassipes*, Koch,² and *Polydesmus denticulatus*, Koch, and additional localities for a third, *Polydesmus coriaceus*, Porat, which has recently been recorded from Ireland for the first time—from Co. Carlow.³

The records are still far too few to allow of any generalisation as to the distribution of the species. It is especially desirable that more specimens should be collected from the inland counties. It will be noticed that practically all the records published are from counties on or near the coast. Hardly a single specimen has been taken in the central plain, and the following counties are unrepresented by records:—Roscommon, Leitrim, Longford, Queen's County, Tipperary, Limerick. Several others such as Clare, Kilkenny, King's County, Kildare, Westmeath have only one or two records.

The counties whose Myriapod fauna is fairly well known are the following:—Antrim, Down, Dublin, Wicklow, Cork, Kerry, Galway, Derry, and Armagh, nearly all on

¹ Rev. W. F. Johnson, *Proc. Roy. Irish Acad.*, vol. xxxi., Clare Island Survey, part 33.

² See, however, Rev. W. F. Johnson's list, p. 129, of this number.

³ A. Randall Jackson, "On some Arthropods observed in 1911 and 1912." *The Naturalist*, March, 1913.

the coast, and all more or less mountainous. It would be interesting to compare the fauna of these districts with that of the low-lying central plain.

The initials given after the localities refer to the collectors :—

D.R.P.-B.	..	D. R. Pack-Beresford.
G.H.C.	..	Prof. G. H. Carpenter.
A.B.F.	..	Mrs. Foster.
N.H.F.	..	N. H. Foster.
J.N.H.	..	J. N. Halbert.
A.W.S.	..	A. W. Stelfox.
N.E.S.	..	N. E. Stephens.
R.F.S.	..	R. F. Scharff.
R.W.	..	R. Welch.

CHILOPODA.

LITHOBIIDAE.

Lithobius forficatus, Linné.—Armagh, W.J. Cavan, N.H.F. Cork (Glandore, R.F.S., Crookhaven). Donegal (Lough Salt Mountain, Tory Island). Down (Corry's Glen, N.H.F.; Hillsborough N.H.F.), Dublin (Tallaght, C.M.S.). Kerry (Carrantuohill). Londonderry (Banagher, N.H.F.). Meath (Slane, R.W.). Sligo (Church Island, Lough Gill). Wicklow (Greystones).

L. variegatus, Leach.—Antrim (Glenarm, R.W.; Kinbane, R.W.; Finvoy, R.W.). Carlow (Borris, R.F.S.). Cork (Glandore). Derry (Banagher, N.H.F.; Benevenagh, N.H.F.). Donegal (Lough Salt Mountain, Kilmacrenan, R.W.). Dublin (Dalkey Island). Kerry (Glencar, Macgillicuddy's Reeks, Great Blasket, A.W.S.). Kilkenny. Monaghan (Lord Rossmore's demesne, N.H.F.). Wexford (Courtown, R.F.S.). Wicklow (Bray, Ovoca, Poulaphouca).

L. melanops, Newport.—Antrim (Kinbane, R.W.; Randalstown, R.W.). Derry (Benevenagh, N.H.F.; Dungiven, R.W.). Donegal (Gweedore, R.W.). Down (Hillsborough, N.H.F.). Dublin (Tallaght, C.M.S.). Galway (Roundstone). Kerry (Devil's Punch Bowl, Macgillicuddy's Reeks).

L. crassipes, Koch.—New to Ireland. I have received two specimens—one male and one female—collected by Mr. N. H. Foster at Dungiven, in Derry, and more recently Mr. R. Welch has also taken a single female at Murlough Bay, Antrim.

It may easily be mistaken in the field for the young of *L. forficatus* which it resembles in colour, and it is still more likely to be confused with *L. melanops*. On closer examination it is at once separable from *L. forficatus* by the arrangement of the teeth on the front of the basal part of the maxillary feet. There are only two teeth on each side, while *forficatus* has five or six.

From *L. melanops*, on the other hand, it is distinguished by the complete absence of strongly produced posterior angles on any of the dorsal plates,

and by the shortness of the antennae and anal legs. Number of antennal joints, 20 (occasionally 19 or 21); number in *L. melanops*, 34-41.7

This species ranges over practically the whole of Europe from Scandinavia to southern Austria or Spain, and is also found in Algeria. It is known from England.

SCOLOPENDRIDAE.

Cryptops hortensis, Leach.—Cork (Glandore, R.F.S.). Kerry (Great Blasket, A.W.S.).

GEOPHILIDAE.

Geophilus carpophagus, Leach.—Antrim (Fair Head, R.W.; Murlough Bay, R.W.; Larne, Torr Head, R.W.). Derry (Banagher, N.H.F.). Down (Newcastle, R.F.S.).

G. longicornis, Leach.—Carlow (Borris, R.F.S.). Cavan (Farnham Woods, R.W.). Cork (Glandore, R.F.S.). Kerry (Kenmare). Louth (Collon, R.W.). Monaghan (Lord Rossmore's demesne, N.H.F.).

G. proximus, Koch.—Derry (Dungiven, N.H.F.). Down (Hillsborough, N.H.F.). Dublin (Ballsbridge, C.M.S.). Monaghan (Lord Rossmore's demesne, N.H.F.).

Linotaenia crassipes, Koch.—Kerry (Kenmare). Kildare (Gormans-town).

L. maritima, Leach.—Donegal (Dunfanaghy, R.W., Horn Head, Cratlagh, J.N.H.). Dublin (Howth). Kerry (Kenmare).

Schendyla nemorensis, Koch.—Derry (Banagher, N.H.F.). Wicklow, (Lough Bray, C.M.S.).

Stigmatogaster subterraneus, Leach.—Cork. Dublin (Lambay). Limerick (Kilfinane). Meath (Kells, R.W.).

DIPLOPODA.

POLYXENIDAE.

Polyxenus lagurus, Linné.—Dublin (Howth, C.M.S.; Portrane, G.H.C.).

GLOMERIDAE.

Glomeris marginata, Villers.—Antrim (Torr Head, R.W.; Kinbane, R.W.). Derry (Banagher, N.H.F.; Dungiven, N.H.F.; Benevenagh, N.H.F.). Donegal (Gweedore, R.W.; Cratlagh, J.N.H.). Down (Corry's Glen, N.H.F.). Monaghan (Lord Rossmore's demesne, N.H.F.). Wexford (Courtown, R.F.S.). Wicklow (Greystones).

POLYDESMIDAE.

Brachydesmus superus, Latzel. Cavan (Farnham Woods, R.W.). Derry (Benevenagh, N.H.F.). Galway (Ballynahinch, J.N.H.).

Polydesmus complanatus, Linné.—Derry (Banagher, N.H.F.; Dungiven, N.H.F.). Waterford (Dromana House).

P. gallicus, Latzel.—Antrim (Randalstown, R.W.). Carlow (Borris, R.F.S.). Kerry (Kenmare). Wicklow (Parknashaw).

P. denticulatus, Koch.—New to Ireland. The first specimen was taken by Dr. Scharff at Lough Bray, Wicklow, in 1912, and more recently I have received a specimen from Slane, in Meath, and one from Benevenagh, in Derry, both taken by Mr. Foster.

While examining the specimen from Slane I noticed what looked like a large eye on the right hand side of the head. Just in front of and below the base of the antenna there was a large black area, roughly triangular in shape. It bore an extremely striking resemblance to the ordinary millipede eye until viewed under a lens, when it was seen that this triangle was not made up of a number of separate ocelli closely arranged in rows, but was a continuous pigmented surface.

On the left hand side there was no trace of a pigmented area.

No species of *Polydesmus* has even rudimentary eyes, and they are also wanting in the other genera belonging to the family Polydesmidae.

I have had transverse sections made of the head of the specimen with the object of discovering whether any traces of eye-structure might be present beneath the surface. The animal had lain in alcohol for some time, and had become brittle so that the sections could not be cut as thin as was desirable. They show clearly, however, that the pigment is not confined to the surface only, but is present to a very considerable depth. No trace could be detected, however, of anything in the nature of separate ocelli, possibly because of the thickness of the sections. There was no trace of pigment on the left side.

So far as I know this is the only case on record of a *Polydesmus* possessing even a rudimentary eye.

P. coriaceus, Porat.—This species has recently been recorded for the first time from Ireland by Dr. A. Randall Jackson, who received specimens taken by Mr. D. R. Pack-Beresford in Co. Carlow.

I have recently received a specimen from Mr. R. Welch, who took it at Slane, in Meath. In the Museum I have also found an unnamed specimen taken by Dr. Scharff at Glandore, Cork, in 1898.

CHORDEUMIDAE.

Atractosoma polydesmoides, Leach.—Derry (Banagher, N.H.F.; Dungiven, R.W.). Down (Corry's Glen, N.H.F.). Monaghan (Lord Rossmore's demesne, N.H.F.).

Craspedosoma Rawlinsii, Leach.—Armagh. Cork (Doneraile Cave, R. J. Ussher). Derry (Banagher, N.H.F.). Dublin (Howth, N.E.S.). Wicklow.

IULIDAE.

Blaniulus venustus, Meinert.—Antrim (Randalstown, R.W.). Derry (Banagher, N.H.F.).

B. fuscus, Am. Stein.—Antrim (Kinbane, R.W.). Donegal (Gweedore, R.W.; Cratlagh, J.N.H.). Dublin (Tallaght, C.M.S.). Kerry (Glencar). Wicklow (Lough Bray, C.M.S.).

B. guttulatus, Bosc.—Cork (G.H.C.). Derry (Benevenagh, N.H.F.). Dublin (Blackrock, Shankill and Rathfarnham, G.H.C.). Mayo (G.H.C.). Sligo (Ballysodare). Wexford (Fethard, G.H.C.).

Iulus luseus, Meinert. (= *britannicus* Verhoeff).—Carlow (Borris, R.W.S.) Cavan (Farnham Woods, R.W.). Cork (Glandore, R.F.S.). Donegal (Tory Island). Fermanagh. Kerry (Glencar). Kilkenny. Tyrone (Baronscourt, R.W.).

I. punctatus, Leach.—Antrim (Ballycastle, Randalstown, R.W.). Cavan (Farnham Woods, R.W.). Derry (Banagher and Dungiven, N.H.F.). Donegal (Gweedore, R.W.; Cratlagh, J.N.H.). Down (Corry's Glen, N.H.F.). Dublin (Tallaght, C.M.S.; Howth, J.N.H.). Galway (Tuam). Kerry (Kenmare). Louth (Drogheda, R.W.). Wicklow (Ovoca, Devil's Glen).

I. fallax, Meinert.—Antrim (Randalstown and Kinbane, R.W.). Derry (Dungiven, N.H.F.). Donegal (Gweedore, R.W.). Down (Hillsborough and Corry's Glen, N.H.F.). Kerry (Kenmare, J.N.H.; Cromaglaun, Dingle). Sligo (Ballysodare). Tyrone (Baronscourt, R.W.).

I. ligulifer, Latzel.—Antrim (Torr Head, R.W.). Armagh. Derry (Banagher, N.H.F.; Dungiven, N.H.F.). Wicklow (Greystones, N.E.S.).

I. sabulosus, Linné.—Carlow (Fenagh, D.R.P.-B.). Derry (Toome). King's Co. (Tullamore). Wicklow (Bray).

I. niger, Leach.—Antrim (Kinbane and Torr Head, R.W.; Randalstown and Murlough Bay, R.W.; Ballycastle). Cavan (Farnham Woods, R.W.). Derry (Banagher, N.H.F.; Dungiven and Beneeveragh, N.H.F.). Down (Hillsborough, N.H.F.). Louth (Drogheda, R.W.). Meath (Slane, R.W.). Tyrone (Baronscourt, A.B.F.). Wexford (Courtown, R.F.S.). Wicklow (Ovoca).

I. teutonicus, Pocock.—Kerry (Great Blasket, A.W.S.), young specimen.

National Museum, Dublin.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Capuchin Monkey from Mr. R. H. Franklin, an Irish Stoat from Mr. H. Cogan, a large Goat from Dr. R. F. Scharff, a pied Blackbird from Mr. R. Cody, seven African Finches from Mrs Cullinan, three Pigeons from Miss Bradshaw, a Kestrel from Mr. J. C. MacLean, and an Amazon Parrot from Mr. R. H. Franklin. A pair of Patas Monkeys, a male Ocelot, a young Sea Lion, four Malabar Squirrels, and a pair of White-headed Mannikins have been bought for the collections. From the Toronto Zoological Gardens, Canada, three Beavers have been received in exchange for a pair of Lion-cubs. The Beavers have been placed in the small rock-enclosure to the right of the sea-lion pond, where they may be seen disporting themselves in the water, or nibbling at the tree-trunks, with which they have been provided.

DUBLIN MICROSCOPICAL CLUB.

MAY 14.—The Club met at Leinster House. A. R. NICHOLS in the Chair.

Prof. G. H. CARPENTER showed the hypopharynx and maxillulae of an undetermined Helodine larva, discovered by Mr. H. Scott, in the West Indies, living in the water that accumulates between the leaf-bases of Bromeliaceous plants. The structures resemble those of the larva of an Irish species of *Helodes* lately exhibited before the Club, but show some interesting differences. An account with figures will be published in the forthcoming *Report* of the second International Entomological Congress (Oxford, 1912).

Dr. G. H. PETHYBRIDGE exhibited the seeds of *Trifolium angulatum* W. et Kit., and *T. parviflorum*, Ehr., two species of clover which grow wild in the alkaline soil of certain parts of Hungary. The seeds of the former are strikingly similar to those of Alsike Clover, while those of the latter resemble seeds of White Clover. On the Continent these seeds have occasionally been offered for sale for agricultural purposes, but the plants have little or no agricultural value, except for soils of the nature indicated where other clovers will not grow. Seeds of *T. angulatum* have not yet been found in samples of clover seed examined at the Department's Seed Testing Station, but on two or three occasions seeds of *T. parviflorum* have been found in samples of White Clover, although scarcely in sufficient quantity as to suggest that they were being used deliberately as an adulterant. Botanists on the look-out for aliens might possibly find *T. parviflorum* in co. Wexford. A full account of these seeds will be found in *Die landw. Versuchs-Stationen*, Bd. 81, 1913, p. 433.

CORK NATURALISTS' FIELD CLUB.

FEBRUARY 27.—R. J. USSHER delivered a lecture (illustrated) on "Our Native Birds, and their Breeding Habits," in the Assembly Rooms, to a very large audience. The meeting was held under the joint auspices of the Literary and Scientific Society and the Field Club.

APRIL 14.—The Club met at University College, W. B. Lacy in the Chair. Professor H. A. CUMMINS, C.M.G., delivered a lecture (illustrated) on "Maritime Plant Associations." At the close of the lecture, Prof. Cummins appealed to the members to forward specimens of seaweeds, more especially any collected between Cork Harbour and Bantry Bay, to the College for identification. Prof. Swain also invited members interested in geology or geography to assist in the preparation of a Glacial map of Cork and Kerry.

APRIL 28.—The twenty-first Annual General Meeting was held at 15, South Mall, Prof. Swain (President) in the Chair. The Hon. Secretary (Jas. Noonan) and Hon. Treasurer (W. B. Lacy) read their Reports, which were adopted. A resolution was passed, tendering the warmest congratulations of the Cork Club to the Belfast Naturalists' Field Club on the occasion of the celebration of the fiftieth anniversary of the latter society's foundation. Miss B. Duke, B.Sc., and Miss Dobbin were elected

members of the Club. The outgoing Officers and Committee were re-elected, M. Holland being added to the Committee.

APRIL 30.—GEOLOGICAL EXCURSION.—A visit was paid to the Glacial deposits on the south side of the College Road, and to the limestone quarries, north and south of Dennehy's Cross. Boulder-clay, glacial markings, &c., were pointed out, and bedding, cleavage, and jointing explained. A visit was subsequently paid to the seismograph at University College. Professor Swain acted as conductor.

MAY 28.—EXCURSION TO FOTA.—A party of 30 visited Lord Barrymore's demesne, Fota Island, Queenstown. The members were met by Mr. Besswick, who conducted them through the grounds—the ponds also with their variety of aquatic plants, the fernery, the bamboo garden, and the "Italian garden" being shown. Many rare exotic plants flourish at Fota, the collection of trees of various species being particularly fine. Squirrels were in evidence during the visit, and it was pointed out that they have increased considerably in the demesne during recent years.

REVIEW.

THE LITERATURE OF ASCIDIANS.

A Bibliography of the Tunicata, 1469-1810. By JOHN HOPKINSON. London: Ray Society, 1913. xiii. + 288 pp. Price 15s. net.

Whilst engaged in the arduous task of editing Alder and Hancock's "British Tunicata," Mr. Hopkinson found it necessary to compile a Bibliography of works dealing with this neglected section of the British marine fauna. It was his intention to issue it as a supplement to the third volume of the "British Tunicata," but in the year 1906, acting on the advice of Canon Norman, he decided to include all works treating of the Tunicata, down to the end of the year 1910. The result is now issued as a separate work. It will be a valuable aid to students of the Tunicata, and in a lesser degree to all marine zoologists. The references to the scanty literature dealing with Irish Tunicata seem to be complete. Every possible reference to a Tunicate seems to have been included, from Aristotle to Herdman, and from obscure text-books of zoology to Victoria County Histories. Nevertheless, one receives the impression that this group of animals, so interesting and significant to the evolutionist, has not received its proper share of attention in comparison with other groups. This is undoubtedly due to the difficulties inherent to the systematic study of the Tunicata, and to their lack of direct economic interest.

R.S.

SOME IRISH ICHNEUMONIDAE AND BRACONIDAE.

BY REV. W. F. JOHNSON, M.A., F.E.S.

I have continued to pick up such Ichneumon-flies as I met with since my last paper¹, and the following list shows the results. At Coolmore I obtained my specimens almost without exception at flowers of the Wild Carrot, and mostly caught them with my fingers; by going about it quietly I was often able to take several from the same umbel. These captures were effected between August 20th and September 20th, 1912.

At Poyntzpass I took a good many on the roadside between my house and Poyntzpass village; on a sunny morning there were sure to be some Ichneumon-flies busy at flowers or flitting about the hedge looking for their prey. In several cases it will be seen that I obtained specimens in moss; these were hibernating, as do a number of these insects. Those from Cave Hill and Belfast were taken by my late lamented friend Mr. H. Lamont Orr.

I have to thank Mr. Claude Morley for kind help with the determination of many of these insects, especially among the Ophioninae. He hopes to bring out the volume of his work on British Ichneumons, dealing with this section before the end of this year.

ICHNEUMONIDAE

ICHNEUMONINAE.

Coelichneumon leucocerus, Grav.—Poyntzpass, in August.

C. derasus, Wesm.—Killysavin, Co. Down, in May.

Melanichneumon erythraeus, Grav.—Poyntzpass, in July, in one of my fields, a single specimen. It is very rare in England. The only records Mr. Morley gives are from London and Plymouth.

Barichneumon bilunulatus, Grav.—Poyntzpass, in February, under loose bark on *Pinus sylvestris*.

Ichneumon xanthorius, Forst.—Carlingford, in July.

I. latrator, Fab.—Coolmore, in August and September.
var. **means**, Grav.—Coolmore, in September.

¹ *Irish Naturalist*, vol. xvi., 1907.

- I. subquadratus**, Thoms.—Poyntzpass, in August, and in moss in November.
I. melanotis, Holmgr.—Poyntzpass, in moss, in November.
I. bucculentus, Wesm.—Coolmore, Poyntzpass, and at Ballyworkan, near Portadown, in July and August.
I. suspiciosus, Wesm.—Coolmore, in September.
I. extensorius, Linné.—Coolmore, in August and September.
I. albiger, Wesm.—Poyntzpass, in moss, in November and December.
I. caloscelis, Wesm.—Coolmore, in September, and at Newcastle, Co. Down, in August.
I. insidiosus, Wesm.—Coolmore, in August.
Amblyteles palliatorius, Grav.—Cave Hill Road, in August.
Eurylabus tristis, Grav.—Belfast.
Platylabus pedatorius, Fab.—Coolmore, in September.
P. orbitalis, Grav.—Coolmore, in September.
Phaeogenes suspicax, Wesm.—Poyntzpass, in moss, in January.
P. fulvitaris, Wesm.—Poyntzpass, in moss, in January.
Hemichneumon elongatus, Ratz.—Coolmore, in September.
Alomyia debellator, Fab., var. **nigra**, Grav.—Poyntzpass, in May and July, on flowers at roadside.

CRYPTINAE.

- Microcryptus perspicillator**, Grav.—Coolmore, in August.
M. graminicola, Grav.—Coolmore, in August.
M. bifrons, Gmel.—Poyntzpass, in March, in moss.
M. abominator, Grav.—Poyntzpass, in June.
M. brachypterus, Grav.—Cave Hill, near Belfast.
M. micropterus, Grav.—Coolmore, in September.
Acanthoeryptus quadrispinosus, Grav.—Poyntzpass, in May, taken while running along the edge of a manure pit.
Phygadeuon rufulus, Gmel.—Poyntzpass. It seems to be rare in England.
P. speculator, Grav.—Coolmore, in August.
P. leucostigma, Grav.—Coolmore, in August.
P. hereynicus, Grav.—Coolmore, in August.
Stilpnus pavoniae, Scop.—Poyntzpass, in June.
Atractodes vestalis, Hal.—Coolmore, in September.
Mesostenus transfuga, Grav.—Coolmore, in September, a female. Mr. Morley writes: "Extremely rare in Britain. I have one male from the Isle of Wight, and one female from Plymouth." It occurs throughout Europe.
Spilocryptus migrator, Fab., var. **brevipennis**, Desv.—Rossbeigh, Co. Kerry, in August, taken by L. H. B. Wyse.
Cryptus sponsor, Fab.—Cave Hill, near Belfast. There do not appear to be any recent records of its occurrence in Great Britain.
C. minator, Grav.—Poyntzpass, in July, in one of my fields.

PIMPLINAE.

- Perithous divinator**, Rossi.—Poyntzpass, in May. It is usually bred from bramble stems. I took it on the wing.
- Pimpla brevicornis**, Grav.—Coolmore, in September.
- P. detrita**, Holmgr.—Poyntzpass, in October, on the wing.
- P. examinator**, Fab.—Poyntzpass, in May, among herbage on roadside.
- P. turionellae**, Linné.—Coolmore, in September; Poyntzpass, in August.
- Glypta elongata**, Holmgr.—Coolmore, in September.
- G. monocerus**, Grav.—Coolmore, in September. Neither this nor the preceding species seems to be common, and all the records are from the south of England.
- G. ceratitis**, Grav.—Poyntzpass, in August.
- G. genalis**, Möll.—Coolmore, in September. Apparently very rare.
- G. parvicaudata**, Bridg.—Coolmore, in September. Rare. Mr. Morley ("British Ichneumons," vol. iii., p. 162), says that a pair were bred out of *Hypsipetes ruberata* from Stornoway, in May, and that he knows of two other specimens also bred. Mine, which are two females, were taken on flowers of Wild Carrot.
- G. lugubrina**, Holmgr.—Coolmore, in August.
- Lissonota bellator**, Grav.—Coolmore, in August and September.
- L. variipes**, Desv.—Coolmore, in August and September. Both species were abundant on flowers of Wild Carrot.
- L. sulphurifera**, Grav.—Coolmore, in August and September.
- L. femorata**, Holmgr.—Poyntzpass, in July.
- L. transversa**, Bridg.—Coolmore, in August.
- Lampronota caligata**, Grav.—Newcastle, in August, on sandhills.

TRYPHONINAE.

- Metopius dentatus**, Fab.—Coolmore, in September, flying over shallows. Though widely distributed, it is rare in Great Britain.
- Homocidus obscuripes**, Holmgr.—Belfast, in June.
- H. pectoratorius**, Grav.—Poyntzpass, in June, flying among herbage by roadside.
- H. dimidiatus**, Schr.—Poyntzpass, in May.
- Mesoleius semicaligatus**, Grav.—Coolmore, in August and September.
- M. aulicus**, Grav.—Poyntzpass, in May.
- Tryphon elongator**, Fab.—Coolmore, in August and September;
- T. vulgaris**, Holmgr.—Coolmore, in September.
- T. brunniventris**, Grav.—Coolmore, in September.
- Catoglyptus fortipes**, Grav.—Carlingford, in May.
- Perlissus filicornis**, Grav.—Coolmore, in August; Rosses Point, Co. Sligo, in June.
- P. rufoniger**, Grav.—Coolmore, in September; Poyntzpass, in July.
- P. orbitalis**, Grav.—Poyntzpass, in May.
- P. minutus**, Bridg.—Carlingford, in May. It seems to be rare, for the only record given by Mr. Morley is from Surrey.

OPHIONINAE.

- Ophion luteum*, Grav.—Coolmore, in September, flying to lamp light.
Campoplex bucculentus, Holmgr.—Newcastle, in August.
Casinarina pallidipes, Brisch.—Poyntzpass, in June.
Limnerium albidum, Thoms.—Belfast and Cave Hill, in June.
Echphoropsis viennensis, Grav.—Coolmore, in September, and Carlingford, in May.
Omorga faunus, Grav.—Poyntzpass, in September; Ballyworkan, in July; Coolmore, in August and September.
O. cursitans, Holmgr.—Poyntzpass, in June.
O. mutabilis, Holmgr.—Poyntzpass.
O. ensator, Grav.—Poyntzpass, in June; Belfast, in August.
Oleseicampa longipes, Müll.—Poyntzpass, in June.
Meloboris rufiventris, Grav.—Lough Shark, Co. Down, in August.
M. crassicornis, Grav.—Poyntzpass, in June; Newcastle, Co. Down, in August.
Augitia claripennis, Thoms.—Cave Hill, Belfast.
A. vestigialis, Ratz.—Poyntzpass, in June; Coolmore, in September.
A. tibialis, Grav.—Poyntzpass, in June.
A. majalis, Grav.—Poyntzpass.
Mesochorus vitticollis, Holmgr.—Poyntzpass, in June.
Pectenella latungula, Thoms.—Poyntzpass, in May and June.

BRACONIDAE.

- Rhogas reticulator*, Nees.—Poyntzpass, in July.
Microgaster globatus, Nees.—Coolmore, in August and September.
Macrocentrus infirmus, Nees.—Coolmore, in August.
Alysia manducator, Panz.—Coolmore, in August.
Apanteles vanessae, Reinh.—Newcastle, Co. Down, bred from larvae of *Pyrameis cardui*, taken on the sandhills in August.
 Poyntzpass, Co. Armagh.

NEWS GLEANINGS.

Dr. C. J. Patten and Bird Migration.

At the Royal Society's conversazione at Burlington House, London, in May, Prof. C. J. Patten, whose work is well-known to our readers, exhibited a model and a series of photographs to illustrate his studies at the Tuskar on the migration of birds. We congratulate Prof. Patten on his recent election as President of the Sheffield Naturalists' Field Club.

NOTES.

BOTANY.

The British Ecological Society.

The British Vegetation Committee, whose doings we have recorded from time to time, was formally dissolved on 12th April, and at a general meeting held immediately afterwards at University College, London, the British Ecological Society was founded. The Society will carry on the work of the Committee on a wider basis. One of its principal activities will be the issue of the *Journal of Ecology*, of which the first number has since been published. The Society will meet each April in London, and each autumn in the provinces, with such other meetings as may be arranged. The first President is Mr. A. G. Tansley, Botany School, Cambridge, and the Secretary, Dr. F. Cavers, Goldsmiths' College, London, S.E.

The Hiberno-Lusitanian Problem.

To *Knowledge* for June, Mr. G. W. Bulman contributes an article in which he defends the position that the Lusitanian plants in the Irish flora are portion of a pre-glacial flora. After suggesting that the absence of these particular species in England may be due to a former barrier in that direction he quotes the case of Greenland, where an ample phanerogamic flora now flourishes, which would appear to have survived the glacial period there. He points out that the Lusitanian plants in our flora are mostly not delicate species, and comments on the facts that fossil evidence of the persistence of temperate plants through the Ice Age is obscured by the fact that any deposits containing remains of such species are *ipso facto* set down as inter-glacial.

Irish Seaweeds.

Among the many results of the Clare Island Survey, the importance of an accurate and detailed knowledge of the distribution of plants and animals has been repeatedly emphasized.

With regard to the marine algae, though some areas in Ireland have been well worked, others have been almost untouched, and in view of the publication of a revised list of this group I should like to appeal to Irish naturalists for help in filling up the gaps. The peculiar interest of the flora makes a knowledge of detailed distribution of additional importance. The counties particularly in need of investigation are Donegal, Wexford, and Waterford. It is concerning these that data are most urgently required, but assistance as to any county will be welcome.

Help may be afforded in various ways. Old collections, *if carefully localized*, should be sent for examination. Botanists visiting the districts in question might examine the algal flora, and if unable to spare time in critical study could do valuable service by sending samples or by making collections. Naturalists of any class could carry out the same work. The sympathy of friends, or even children, should also be enlisted, especially those who reside at the seaside. Common species should not be neglected, as the precise range of certain northern and southern species is not yet determined.

Where time does not permit of drying, fresh material may be sent firmly packed in a tin box. It is hardly necessary to add that I should be glad to reply to enquiries or to give further information.

A. D. COTTON.

The Herbarium, Kew, Surrey.

Leucojum aestivum in South Tipperary.

While walking, on May 18th, along the bank of the Suir, near Turtullagh, about two miles from Thurles, I discovered on the extreme point of an island-marsh a large bed and several scattered plants of *Leucojum aestivum* in full bloom, associated with *Caltha palustris*, *Rumex Hydro-lapathum*, *Sparganium vamosum*, *Typha latifolia*, *Scirpus lacustris*, *Carex riparia*, *Phalaris arundinacea*, and other marsh and water plants. The spot is inaccessible, except when the river is very low, and in wet seasons is completely under water, thus agreeing in character with the habitats of this species in all its inland native stations on the Continent, and in England and Ireland. It occurs on tributaries of the same river about thirty-five and forty-five miles further south near Fiddown and Waterford, and, taking all the circumstances into consideration, I see no reason to doubt its being indigenous in this locality.

R. A. PHILLIPS.

Cork.

ZOOLOGY.

Golden Oriole in County Tyrone.

Mr. W. C. Wright records (*British Birds*, vol. vii., p. 16) the capture of a female Golden Oriole, *Oriolus galbula*, at Coalisland, Co. Tyrone. Mr. Henry Wilson, by whose dog the bird was caught (not found dead as stated by Mr. Wright) informs me that it was one of a party of four which were observed in the neighbourhood for a few days only in May. About fifty Golden Orioles have been seen or taken in Ireland, almost all in maritime counties, and this forms the first bird of this species from Co. Tyrone.

NEVIN H. FOSTER.

Hillsborough, Co. Down.

A Blackbird's Note.

There is a note or call to be heard in our woods and hedges, a common note of one of our commonest birds, yet I think few of our readers could name its author. It is a sort of low whistle ; two parts whistle and one part sigh, perhaps describes it fairly well ; it lasts two or three seconds, and is repeated at intervals of about the same duration, and often goes on for several minutes. It has something of what Gilbert White calls an "inward" quality, and is pitched in such a key that, like the squeak of a bat, it is inaudible to many ears. It is highly ventriloquial, and almost impossible to locate, as it comes from north, south, east, and west, and far or near in bewildering succession, or seems to do so. It has puzzled me for years. I could find nothing about it in books, so I consulted some of our best field naturalists, but they could not name the author, and yet it is nothing more mysterious than the Common Blackbird. Do many readers know this ?

G. H. PENTLAND.

Blackhall, Drogheda.

OBITUARY.**NATHANIEL H. ALCOCK.**

It is with very deep regret that we record the loss of Professor N. H. Alcock, M.D., D.S.C., at the early age of 42 years. After graduating with high honours at the University of Dublin, his native city, in 1896, he studied in Germany, taught in the medical school at Manchester, and came back to Trinity College as demonstrator in physiology in 1898. During the succeeding years he served as Secretary of the Dublin Field Club, and worked enthusiastically at the Irish Mammalia. His papers on the "Natural History of Irish Bats," published in this Magazine (vols. viii., x.), partly in collaboration with C. B. Moffat, gave promise of brilliant zoological achievement. But in 1901, Alcock removed to London and began to devote himself to physiological teaching and research, gaining fame by his precise experimental work on the nervous system. He published papers on the relations of the physical, chemical, and electrical properties of nerves ; on the variation of the velocity of nerve-impulses in relation to stature ; and on the influence of anaesthetics on nervous phenomena. In 1911 he was appointed to the chair of physiology at McGill University, Montreal, an institution which has been a temporary home for many brilliant men. Alcock's numerous friends in England and Ireland grieve to think that they cannot hope for his return in the fullness of his powers to the scenes of his early successes.

G. H. C.

THE WHALE-FISHERY IN IRELAND.

BY R. F. SCHARFF, PH.D., F.L.S.

In the Report of the eighty-second meeting of the British Association, held at Dundee last year, appears a very interesting series of notes on the Belmullet whaling station in the west of Ireland. These notes form the report furnished by Mr. Burfield to the Committee appointed by the Association to investigate the biological problems incidental to the Belmullet whaling station.¹

In a short article published two years ago,² I indicated the number and kind of whales captured in 1910 by the two Irish Whaling Companies. This was all the information I could obtain at the time. The Blacksod Whaling Company in 1910 caught 55 whales. In 1911, no less than 63 individuals were procured. But Mr. Burfield supplies us with many other noteworthy particulars.

COMMERCIAL.

The sixty-three whales yielded 2,200 barrels of oil, or about 366 tons, the market price being about £23 per ton. We note that most of the oil goes to Glasgow, where it is apparently sold to manufacturers of explosives, who extract glycerine from it. Between six and seven tons of whalebone were gathered from these whales. The price obtained was £45 per ton. Much of the whalebone is sent to Paris, where a considerable quantity appears to be used in the manufacture of silk fabrics in the form of fine threads. The residue from the meat and bones is dried and ground down, the mixture being sold as guano. The ground meat alone is exported to Norway for cattle food. Still further by-products, such as glue, may be obtained in future from this industry.

¹ *Report Brit. Assoc.* (Dundee, 1912), pp. 145-186, 1913.
Irish Naturalist, vol. xx., 1911, p. 141.

BREEDING OF WHALES.

Only one young whale is born at a time, twins being very rare. The young are born in the winter or early spring, and are said to be from a quarter to a third the length of the mother.

SIZE AND COLOUR OF WHALES.

In a brief review of the whales, porpoises and dolphins observed in Irish waters,¹ I endeavoured to give the sizes of the specimens so far as they were known to me. But the measurements, which were mostly extracted from newspaper reports, were frequently doubtfully accurate, while in many cases none were obtained at all. Hence, we knew very little from actual observation of the size of these creatures frequenting the Irish seas. Mr. Burfield paid special attention to this subject.

The largest Irish whale is the Blue Whale (*Balaenoptera Sibbaldi*). It was reported to me that in 1908 a specimen was captured at Inishkea, measuring 88 feet, while Mr. Burfield records one of 84 feet. All the Blue Whales seen by Mr. Burfield were females.

Of the Common "Finner," as it is often called (*Balaenoptera musculus*), a skeleton of which is suspended from the ceiling in our Natural History Museum, few exact measurements had been recorded. Mr. Burfield gives no less than fifty-three. The largest specimen measured, which was a female, was 75 feet long, the largest male being 68 feet.

As it has been suggested by some authorities that the Blue Whale and Common Finner might prove to be varieties of the same species, Mr. Burfield's remarks on this point are noteworthy. In the colour and arrangement of the grooves there is no great difference between the two, but the dorsal fin of the Blue Whale is relatively much smaller than that of the other. The whalebone of the Blue Whale is thicker than that of the Finner, and of a

¹ SCHARFF, R. F. : A list of the Irish Cetacea. *Irish Naturalist*, vol. ix., pp. 83-91, 1900.

uniform blue-black colour. In the Finner the colour is variable, but the bristles are never black as in the Blue Whale, being generally of a yellowish colour.

FOOD.

As a rule, the two kinds of whale referred to live exclusively on minute surface-forms of animal life. Occasionally, however, the "Finner," at any rate, seems to prefer larger morsels. Mr. Burfield found that the stomachs of three of the "Finners" contained the remains of small fish—apparently young herrings. All the other whales examined were full of a small red crustacean, which is known as "krill" among whale fishers.

PARASITES.

The parasitic Copepod *Penella balaenoptera* was found on the body of some of the Finnens, while *Balaenophilus unisetus* was noticed on the baleen of both whales. The internal parasites *Monostomum plicatum* and *Echino-rhynchus brevicollis* were identified.

There are also valuable observations in Mr. Burfield's report on the eye, on some problematic organs and on the foetuses of *Balaenoptera musculus* and *B. Sibbaldi*.

National Museum, Dublin.

A FEW SPECIES OF NEMATODA FROM CO. DUBLIN.

BY T. R. HEWITT, A.R.C.SC.I.

In addition to the notoriously destructive species *Tylenchus devastatrix* Kühn, the following five species of Nematodes were found in Narcissus bulbs, grown at Glasnevin, during the past winter:—*Cephalobus striatus* Bastian; *Cephalobus longicaudatus* Bütschli; *Monohystera bulbifera* De Man; *Dorylaimus longicaudatus*, Bütschli; and *Rhabdites aspera*, Bütschli.

The bulbs were being examined for *Tylenchus devastatrix*, the eelworm that causes a large amount of damage to onions, Narcissus bulbs, oats, and clover. The other five species are free-living Nematodes; they live mainly on decaying vegetable matter, and can be found in the soil. They were found in the damaged parts of the bulbs, living on the material destroyed by the *Tylenchus*. They are worth recording, as I can find no previous record of their occurrence in Ireland in any literature to which I have access.

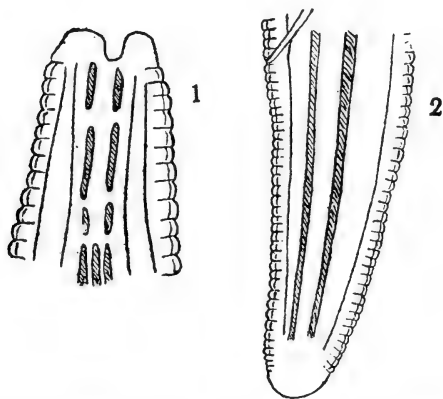


Fig. 1, *Cephalobus striatus*, head; fig. 2, tail (after De Man). Magnified.

A short description, distinguishing the main characters of each species, is given below, but for a more detailed description, those interested are referred to the memoirs mentioned at the end of the paper.

Cephalobus striatus Bastian.—This is a small short worm, rather stout in comparison to its length, about .55 mm. long, with a very blunt tail end (fig. 2); the cuticle is striated in some parts; the mouth has no dart, but there are a number of thickenings in the walls of the gullet (see fig. 1). The vulva is about one-third of the body-length from the the tail end; they are rather sluggish worms, and may be easily examined alive,

Cephalobus longicaudatus Bütschli.—This worm is longer than *C. striatus*, and the tail is long and pointed; the tail of the male is more suddenly constricted than that of the female (see figs. 4 and 5). Both species have a large oesophageal swelling in which there is a star-shaped kind of chitinous "mill." Quite a number of both species were found.

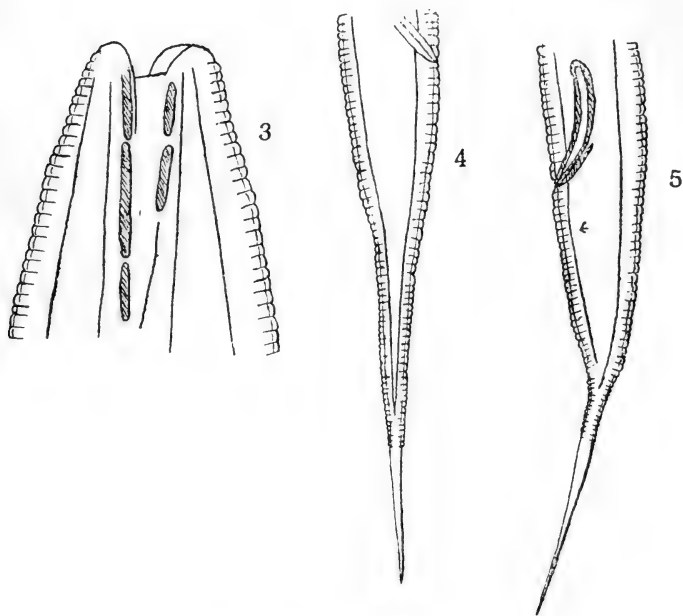


Fig. 3, *Cephalobus longicaudatus*, head; fig. 4, tail of female; fig. 5, tail of male (after De Man). Magnified.

Monohystera bulbifera De Man.—This is a very small eelworm only about .33 mm. long, but very agile. It is distinguished by the large oesophageal swelling, and the structure of the head and tail (see figs. 6, 7, and 8). As is shown in the figure, the tail is suddenly constricted to a very small blunt point.

Dorylaimus longicaudatus Bütschli.—Only one male specimen of this species was found. This is a comparatively large worm, being very much longer than any of the others. The female is about 3.3 mm. long, and the male 2.8 mm., but very slender, its breadth being about $\frac{1}{30}$ to $\frac{1}{35}$ of its length. The specimen was 2.8 mm. long; the mouth has a very stout rather blunt dart which is slightly protruded, and on the gullet there are thickenings in the wall which appear like two little bars crossing it. The head end also bears a few papillæ (fig. 11). The male has two stout spicules (fig. 12), and the tail is very long and slender.

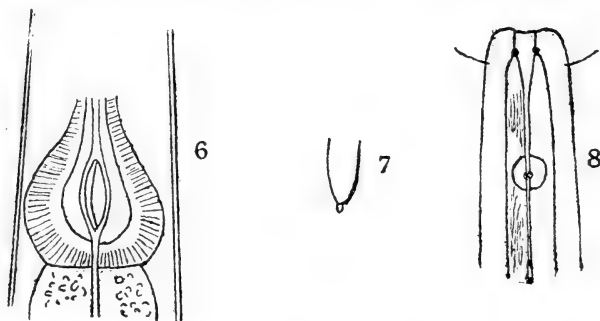


Fig. 6, *Monohystera bulbifera*, oesophageal bulb; fig. 7, tail; fig. 8, head (after De Man). Magnified.

Rhabdites aspera Bütschli.—This species was found in large numbers in some of the bulbs. It is about 1 mm. long; the male has two stout spicules and a large ribbed bursa (see fig. 10); the tail is short and very slender. It is distinguished from another species, *Rhabditis longicaudatus*, which closely resembles it, by the thickenings in the wall of the gullet, and the shape of the spicules and bursa; *R. longicaudatus* has also a much longer and thicker tail.

Royal College of Science, Dublin.

REFERENCES.

- O. BÜTSCHLI, *Verhandl. Leop. Carol. Akademie*, xxxvii, 1873.
J. G. DE MAN, *Die Nematoden der niederländischen Fauna*, Leiden, 1884.

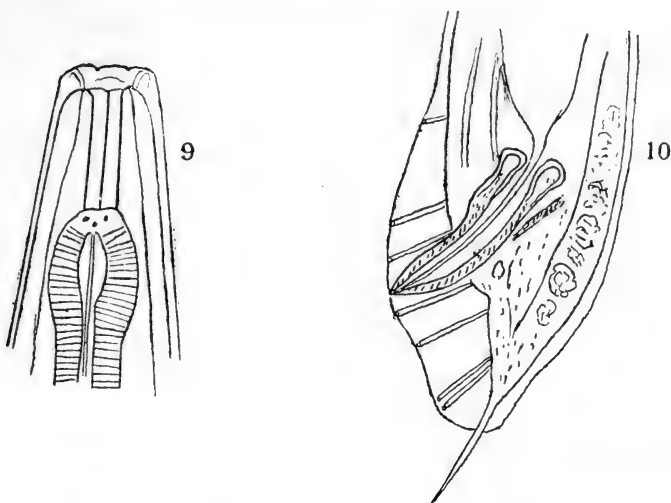


Fig. 9, *Rhabditis aspera*, head ; fig. 10, tail of male, showing bursa and spicules. Magnified.

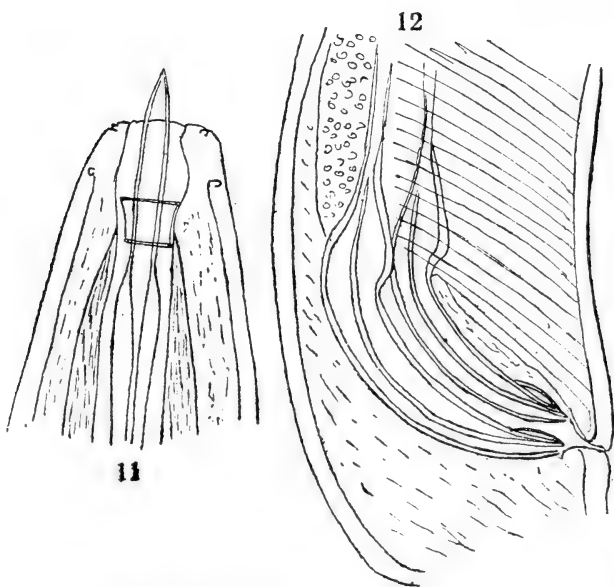


Fig. 11, *Dorylaimus longicaudatus*, head ; 12, tail region of male, showing spicules. Magnified.

SOME NOTES ON THE MIGRATION OF RICHARDSON'S AND POMATORHINE SKUAS.

BY ROBERT WARREN.

During my long residence at Moy View, Co. Sligo, on the shore of the Moy estuary, I have been fortunate in discovering two direct lines of migration followed every season. One, that of Richardson's and the Pomatorhine Skuas, at the end of September and through October, on their southern journey; the second, that of the White Wagtails, *Motacilla alba*, on their spring northern movement.

During calm fine weather, the skuas on their passage keep at such a height as to be unseen or unnoticed, which fact I verified one day in the last week of September, as I was in the harvest field, with my workmen cutting oats, when about 11 o'clock, chancing to look upward, I saw a party of eleven dark-coloured birds passing away to the south-west; they were at such a height as to be barely visible (not appearing larger than swallows), and only for their long tails showing clear against the blue sky, I would not have known them to be skuas.

I first observed skuas on the 8th of October, 1851. My brother first noticed a little flock of six birds coming in from the north, and passing over Bartragh at an immense height, and crossing the country to the south-west. Later in the day, as we were returning from Killala, I observed another flock of eight coming in, and passing away in the same course (to the south-west) as the first flock. At that time the weather had been fine and calm, but shortly after it changed to showery and stormy, which held on till the 15th, which was very stormy, blowing from the south-west, on which morning my brother and I observed several small detached flocks of skuas coming from the north; these, after passing over the sandhills, lowered their flight, and flew low over the estuary and along the river for more than a mile, and then directed their course across the country to the south-west. We remained until 12 o'clock watching these small flocks coming in and passing away

after their comrades, and during that time we counted seventy-two birds. We were then called away to see to some business matters, and when we returned, the flight had ceased for that day. Next morning, we were out early, and found the flight was continued, and while we remained on the watch—eight to eleven o'clock—over one hundred birds passed. Having shot one, which was an immature Richardson's Skua, I concluded that the flight consisted of that species. Many of the birds, by their mode of flight, appeared tired, and some would occasionally pitch on the calm water, as if to drink or rest, but after a few moments would rise, and follow their companions. There were a great many of the black sooty variety, while the greater number appeared to be young birds of the year, exhibiting short tails.

One singular fact regarding these skuas was, that although there were plenty of small gulls on the sands, none, so far as we saw, were molested by the passing skuas, which steadily held on their course to the south-west.

However, this unusual sight of large numbers of skuas on migration sharpened our faculties, and we afterwards kept a good look-out for them; and the result was, that during my brother's residence on the island of Bartragh from 1851 to 1854, he observed every October, during stormy, broken weather, small flocks of skuas coming in, and passing to the south-west. But he never observed any birds passing in fine or calm weather, proving that during fine weather they pass at such a height as to be unseen or unnoticed.

After my brother had left Bartragh, there was no one to watch the birds there. I had to take up the part of watchman at Moy View, and my experience was like his; frequently during stormy weather in October, I observed small flocks passing up the estuary, and away to the south-west.

The next large flight of skuas seen on migration was in 1862. For some days up to the 22nd of October, the weather had been very bad, gale succeeding gale, accompanied by showers of hail and heavy rain; that morning

being very wet. I did not leave the house ; but at eleven o'clock, as I was standing at the parlour window, looking down the estuary, and thinking it was in similar weather in October, 1851, that the great flight of Richardson's Skuas appeared, I suddenly observed eleven dark-coloured birds slowly flying up the estuary. That they were skuas at once occurred to me, so taking my gun, I ran down to the shore, too late for a shot at the passing birds ; two or three more flocks passed out of range, but a little flock of five birds passing within shot, I was fortunate in obtaining one of the lot, which proved to be a beautiful adult Pomatorhine Skua. Several other flocks passed from time to time without coming within range ; but just before leaving the shore I obtained another fine adult. The flight for that day ceased about three o'clock, and as far as I could judge, all the birds coming under my observation were Pomatorhines, their clumsy-looking tails easily identifying them, showing in such strong contrast to the elegantly pointed tails of the smaller species. Next morning, the 23rd, I was out early, and as I expected, found the flight continued. But, in consequence of the wind changing to north-west, the skuas kept along the westerly (Mayo) shore, on the opposite side of the estuary, and none during that day's flight came within range of my gun. I think more birds passed in the second day's flight, but owing to the distance at which they passed from the Moy View side of the estuary, I was unable to say decidedly to which species they belonged. Although the gale still continued on the second day, all the skuas left the estuary, with the exception of a few tired birds, which very probably were unable to continue their course until after a day or two's rest on the sands.

Some weeks after, Dr. Neligan, of Tralee, wrote to the Dublin Natural History Society, stating that on the 25th, Tralee harbour was visited by a large flight of skuas, both Pomatorhines and Richardson's, and a pair of the Great Skuas. While the gales lasted, they remained about the harbour for several days, but all disappeared on the gales subsiding.

I think one may safely infer that the skuas visiting Tralee harbour, on the 25th, two days after the flight passed up the Moy estuary, were one and the same flight. I may suggest that the line of flight of these skuas after leaving the Moy Estuary, was along the line of lakes (Loughs Conn, Cullen, Mask, and Corrib) breaking out from the end of Corrib on the Galway coast, and then along the coast to Tralee harbour, but it is difficult to account for the two days that elapsed from the time they left the Moy estuary on the 23rd, till they appeared on the 25th in Tralee harbour. The only way I think it possible to account for these two days, is, that the birds on their way along the coast, finding the gales too heavy for their progress, took refuge and shelter within the mouth of the Shannon. Skuas have been shot on Lough Conn during the month of October. I saw a black variety of the Pomatorhine shot by Mr. Garvey on that lake; and on another occasion I was given a bird in similar plumage shot at Killaser (inland) twenty miles from the sea, but in the vicinity of Lough Conn.

Very few skuas are seen in the estuary on their return north on the spring migration. Generally two or three, or at most half a dozen birds appear in the estuary, with the return of the terns early in May. They seldom remain longer than a few days, taking toll from the terns while they stay.

Ardnaree, Monkstown, Co. Cork.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a young female Indian Elephant from the Maharajah of Mysore, eight Rabbits from Messrs. R. and H. Browne, eight Waxbills from Mr. Carden Buckley, an African Grey Parrot from Capt. O'Callaghan, and a White Dove from Mr. S. P. Preston.

The young Elephant is about three years old, and has the head and part of the back clothed with long black hairs; it has a pair of small but evenly developed tusks. Its appearance offers an interesting contrast to that of the seven-year old "Roma" of the same species.

BELFAST NATURALISTS' FIELD CLUB.**Fiftieth Anniversary.**

The fiftieth anniversary of the foundation of the Belfast Naturalists' Field Club was celebrated by a series of meetings and excursions, commencing on May 10, and lasting for a week. The opening function was held at Queen's University, Belfast, on the morning of May 10, when the President (Rev. CANON LETT) received the delegates sent by sister societies. The following societies and institutions were represented:—Birmingham Natural History and Philosophical Society, Bournemouth Natural Science Society, Conchological Society of Great Britain and Ireland, Dublin Naturalists' Field Club, Geological Survey of Ireland, Geological Society of London, Geologists' Association of London, Hertfordshire Natural History and Field Club, Limerick Field Club, Liverpool Naturalists' Field Club, Malacological Society of London, North Staffordshire Naturalists' Field Club, Presbyterian Historical Society of Ireland, Ray Society, Royal College of Science for Ireland, Royal Dublin Society, Royal Irish Academy, Royal Society of Antiquaries of Ireland, Royal Zoological Society of Ireland, and Royal Philosophical Society of Glasgow. Congratulatory messages were received from the Cardiff Naturalists and other societies.

The PRESIDENT extended a hearty welcome to the members and the friends who had come to them from England and Scotland. Speakers who would follow would tell them something about the doings of the Society in the past and the present, and he hoped some of the speakers might touch on the point of how to increase the influence and membership of the society. He would ask Mr. Praeger, who was Vice-President of their Society, and delegate from the Royal Irish Academy, to speak.

R. LL. PRAEGER gave an interesting address on the history and doings of the Club since its foundation fifty years ago. The Club, he stated, owed its origin to the old Department of Science and Art. It was in 1860 that the system of science classes, which some years previously had been inaugurated, was extended to Ireland. During the winter 1860-61 the first course of lectures was given—a course of lectures in geology by Professor Jukes. In the following year Professor Ralph Tate came to continue the lectures. His classes were very well attended, and were highly successful. One effect of the lectures and the discussions held in connection with them was a letter published in January, 1863, written by W. T. Chew, advocating the establishment in Belfast of a field club such as existed in a number of English towns. It was followed by two other letters backing up the proposal, from Hugh Robinson and Samuel Alexander Stewart, who for the whole of their lives were active and earnest members of the Club. The three writers met in council, and as a result a circular was sent round Tate's class, followed by a public meeting, at which a large number of members were enrolled, and the Club commenced its activities. The first excursion was held in April of the same year, when a party of over 100 went to Larne and Islandmagee. The geological bent imparted by the lectures was continued during the earlier years, and had been continued practically ever since, geological

traditions always being particularly strong in the Club. The Club thus founded continued regularly to hold summer excursions and winter meetings, and had done so continually for fifty years. Mr. Praeger then gave an account of the Club's work in various domains of science.

GEORGE DONALDSON, one of the original members, followed with a series of reminiscences of the earlier days of the Club. WILLIAM GRAY (an ex-president), Sir CHARLES BRETT, and W. H. PATTERSON, all original members, also spoke of the value of the Club's work.

Brief addresses were given by the visiting delegates, congratulating the Club on attaining its jubilee. These were Professor James Wilson, delegate from the Royal Dublin Society; Dr. A. Smith Woodward, senior Secretary of the Geological Society of London; Count Plunkett, President of the Royal Society of Antiquaries of Ireland, and Director of the National Museum; John R. B. Masefield, delegate from the North Staffordshire Naturalists' Field Club; Dr. George Neilson, President of the Royal Philosophical Society of Glasgow; Professor Grenville A. J. Cole, Dean of the Royal College of Science for Ireland, and Director of the Geological Survey of Ireland; Reginald A. Smith, British Museum; and R. M. Barrington, delegate from the Dublin Naturalists' Field Club, and the Royal Zoological Society of Ireland. W. H. Phillips, one of the oldest members of the Club, was presented with an address by the President in recognition of his twenty-eight years' services as honorary Treasurer. Mr. Phillips returned thanks for the gift, which he said had taken him very much by surprise.

On the motion of the President, seconded by Mr. F. A. Heron, a vote of thanks was passed to the visiting delegates, and this was acknowledged by W. H. Holt (Liverpool) and H. Overton (Birmingham).

In the afternoon a party of the Club members and visitors, conducted by R. J. Welch, drove to the Giant's Ring, a very large *lis* with a cromlech in the centre, surmounting a hill a few miles south of the city. On arrival the party examined the rath and cromlech, and Alec G. Wilson gave a very interesting account of what was believed to be the origin of the structure. Reginald Smith, of the British Museum, speaking after Mr. Wilson, raised several very interesting points, and showed the members of the Club some lines along which they might have investigations carried out.

In the evening the delegates, members, and their friends attended a conversatione in the Assembly Hall. Many interesting exhibits were on view; these included:—Miss Elizabeth Andrews, some rush crosses and harvest knots. Major R. G. Berry, West African implements and other objects, and the original drawings and MSS. by Edward Getty for pamphlet on Tory Island. W. J. Fennell, examples of art metal work of ancient Ireland and measured drawings of souterrains; Thomas Luney, early Irish coins and medals. William Hayes, medals by Irish medallists. Rev. Canon Lett, flint implements. J. W. Dunlop, ancient stone implements. Joseph Skillin, a recent find of flint implements; implements from the Bann, and unusual types; a rare specimen showing marks of lashing for hafting. William Gray, photographs illustrating the character and distri-

bution of prehistoric flint and stone implements. A. R. and D. J. Hogg, archæological photographs taken in Ulster. R. J. Welch, photographs of "survivals" and other archæological objects. Rev. D. Stewart, Muster Rolls of County Down, 1630; Belfast pamphlet encouraging emigration, 1717; three pikes, 1798; and MS. Book of Killyleagh Academy, 1710. W. J. Knowles, "survivals" of the Palæolithic age, including many varieties of scrapers. N. Carrothers, local plants; R. Ll. Praeger, a display of rare Irish plants, illustrated by photographs and fresh and dried specimens. W. J. C. Tomlinson, typical plants of the basaltic escarpments of Antrim and Derry, the British species of *Spiranthes*, *Adoxa moschatellina*, L., from its only Irish station. A. W. Stelfox, some Irish Saxifrages; W. E. Hart, specimens of *Morchella conica* from Culdaff, East Donegal; Miss M. D. Mitchell, a few local Myxomycetes. W. H. Phillips, fern fronds. Nevin H. Foster, varieties of *Athyrium Filix-foemina* raised from spores. Robert Bell, collection of Upper Cretaceous fossils from Londonderry and Antrim; Miss M. K. Andrews, specimens of the orbicular granite of Mullaghderg, County Donegal; Charles Bulla, a fossil fish from Irish Carboniferous rocks. James Orr, local Liassic fossils. Joseph Wright, Pleistocene Foraminifera. Dr. A. R. Derryhouse, topographical models of the Belfast district, a core from the boring in the Triassic conglomerate at Stranmillis, and minerals from the Mourne granites. R. J. Welch, photographs illustrating local geology. J. Wilfrid Jackson, fossil vertebrata and mollusca from Dog's Hole Cave, Lancashire; L. Mueller, minerals, zeolites, and Cretaceous fossils from Cave Hill. Dr. R. F. Scharff, remains of mammoth, hyæna, reindeer, and other animals from the bone-cave at Doneraile, county Cork. George Donaldson, local lepidoptera and marine mollusca. N. H. Foster, maps showing the recorded distribution of woodlice in Ireland. Joseph Maxwell, microscopic pond-life, including living and mounted examples of Volvox, rotifers, and entomostraca. R. H. Whitehouse, local planarians. R. J. Welch, living examples of local molluscs, including *Arianta arbustorum* from Cavan, *Vitrea hibernica* from type locality; A. W. Stelfox, maps showing types of distribution of the Irish terrestrial mollusks.

Before the close of the meeting the following new members were elected:—

Mrs. Carrothers, Miss Cunningham, D. M. Bell, Samuel Ferguson, and two new members of the junior section, Miss N. Gardner and G. Elliott.

On Monday, 12th, the delegates and members proceeded to Newcastle, where Slieve Donard and Donard Lodge woods were visited. In the evening, Dr. R. F. Scharff lectured in the Queen's University on "The Relationships of the Irish Fauna." Rev. Dr. Hamilton, Vice-Chancellor of the University, occupied the chair.

Early the next morning the party started for a five-days' tour on the north coast of Derry and Antrim. While half of the number spent the day exploring the precipices of Benevenagh, the remainder visited Port-stewart and the sand-dunes at the mouth of the Bann. All proceeded in the evening to the Giant's Causeway, where after dinner R. Ll. Praeger

lectured on "Problems of the Irish Flora." Next day was devoted to a full examination of the Causeway, and the magnificent series of headlands to the east of it. In the evening Dr. A. R. Derryhouse lectured on "Features of Local Geology."

Thursday was devoted to White Park Bay, Ballintoy, and Kinbane, and on Friday a long day was spent on Fair Head and in Murlough Bay. The following morning was devoted to Glenshesk and Armoy; in the afternoon a return was made to Belfast, and the party broke up.

A full account of the week's doings, including the speeches delivered at the Anniversary Meeting on May 10 and the scientific observations made on the excursions, will be published in the next (1913-14) issue of the Club's "Proceedings."

MAY 31.—EXCURSION TO NEWRY.—Twenty-two members travelled from Belfast by the 9.55 train. Upon arrival at Newry the President (Rev. Canon Lett, M.R.I.A.) conducted the party to Smith's nurseries on Daisy Hill. At the entrance, the members were met by Mr. Thomas Smith, who took over the duties of guide for the remainder of the day, and showed the members his remarkable collection of plants.

After lunch a small party proceeded to explore Camlough Mountain in search of mosses and hepatics, while the remainder stayed in the gardens or walked up the valley by the canal towing-path. In this waterway were found enormous numbers of the water-snail *Paludetrina Jenkinsi*. Its complete absence above the first lock just outside the town, suggests that this species is spreading inland from the estuary marshes, where it has been known to occur for some years. By six o'clock all had gathered at the Shelbourne, where tea was served, after which a short business meeting was held. Miss Alice Churchill was elected a member of the Club.

JUNE 7.—The archæological section visited Ardglass under the guidance of F. J. Bigger, inspecting the church, Margaret's Castle, and Castle Shane, with its quaint old-time plenishings.

JUNE 28.—EXCURSION TO SLEMISH.—Travelling by 12.25 train to Ballymena, brakes conveyed the party up the valley of the Braid, through Broughshane, to the northern slopes of Slemish. From a geological point of view, this mountain is of interest, being formed of a consolidated plug of lava which filled the vent of an Eocene volcano during the later stages of volcanic activity in the district. Botanically, too, Slemish deserves attention, for here are to be found some local and many interesting plants, and it was for the purpose of studying these that the excursion was mainly undertaken. The party was led by S. A. Bennett, who during the ascent pointed out the chief "plant associations" met with, and described their features, as well as the dominant plants of each. Tea was provided for the party on their descent at Mr. Montgomery's farm, after which four new members—Miss A. Boyd and Messrs. Michael C. Andrews, Stoupe, M'Cance, and Robert MacIlwaine—were elected members.

DUBLIN NATURALISTS' FIELD CLUB.

APRIL 5.—EXCURSION TO HOWTH.—Eighteen members under the leadership of Miss M. C. Knowles, left Amiens Street by the 12.50 train for Sutton, where they took the Summit tram to the Bailey Post Office. Near this point the descent of the cliffs was made, and Miss Knowles gave a most interesting demonstration of the various species of lichens growing on the shore. Special attention was drawn to the very distinct zones found about high-water mark, each zone being composed of a different species. From a point about half-way down the cliffs the different coloured bands could be very distinctly seen.

MAY 3.—EXCURSION TO BLESSINGTON AND POULAPHOUCA.—The party, consisting of fourteen members, left Terenure at 12 noon, and travelled as far as Blessington by the steam tramway. The conductor, Prof. Cole, first led the party to the junction of the Liffey with the King's River, where he explained how the course of the former stream had probably been reversed by changes brought about during the Ice Age. Before that time the Liffey probably took a much shorter and more direct course to the sea than that which it follows at the present day. Possibly the deep cleft known as the Slade of Saggart represents the old channel of the river. The club afterwards went on to Poulaphouca to examine the gorge and waterfall.

MAY 31.—EXCURSION TO JOBSTOWN AND BALLINASCORNEY.—This excursion, conducted by W. B. Wright, was attended by eighteen members, who took the Blessington steam tram as far as Jobstown, from which point they walked over the hills to Ballinascorney, where the conductor pointed out various features of geological interest. The gap near the top of Slievenamonogue was then visited, and its formation during the Ice Age explained. Afterwards the party proceeded to Brittas, returning to Dublin by the 8 o'clock tram.

DUBLIN MICROSCOPICAL CLUB.

JUNE 28.—ANNUAL EXCURSION.—Ten members took the 10.15 train from Harcourt Street to Aghrim, and drove up the valley of the Ow towards Aghavanagh. Turning to the mountain road they visited by kind permission of the owner, Mr. Pierce Mahony's shooting-lodge at Mucklagh, where a beautiful rock-garden in full bloom was greatly admired. Most of the party then ascended Mucklagh mountain and two members made their way to the summit of Croaghanmoira before rejoining the cars. The day being exceptionally clear and fine the views were magnificent. The evening mail train was caught at Rathdrum and a halt for dinner was made at Bray before the party returned to town.

REVIEWS.

ECONOMIC ORNITHOLOGY.

The Food of some British Wild Birds. By WALTER E. COLLINGE, M.Sc., F.L.S., Pp. viii. + 110. London: Dulau & Co., 1913. Price 4s. 6d.

To this useful volume, the author has prefixed as a motto the aphorism that "Economic Ornithology has progressed to the point where intensive studies are demanded." A contribution to such intensive study is furnished in the original observations on the stomach-contents of twenty-nine common species of birds as to whose standing to the farmers' or gardeners' industry more or less doubt exists. Of these only seven—The Missel Thrush, Blackbird, Greenfinch, House Sparrow, Bullfinch, Wood Pigeon, and Stockdove—are put definitely on the "black list;" but Mr. Collinge believes that the Chaffinch, Rook, and Starling are far too numerous and would become beneficial if a reduced population should obviate the necessity for grain-eating. Indeed, that hopeless pest, the House Sparrow, might become, Mr. Collinge thinks, a reformed character were he no more abundant than the Redbreast! A chapter on birds as distributors and destroyers of weed seeds suggests some interesting problems, and an extensive bibliography adds much to the value of the book.

G. H. C.

ZOOLOGICAL NATURE STUDY.

An Introduction to Zoology with Directions for Practical Work (Invertebrates). By ROSALIE LULHAM, B.Sc. With illustrations by V. G. Sheffield. Pp. xvi. + 458. 328 text-figures. London: Macmillan & Co., 1913. Price 7s. 6d.

This brightly-written volume differs in many respects from the familiar zoological text-book. It deals, to quote the preface, "almost entirely with the habits and external structure of common British invertebrate animals," details of internal anatomy being only occasionally introduced. Those who use it as a guide to practical work in the observation of live specimens and the study of structure will acquire a good all-round knowledge of the common animals of the hedgerow, woodland, pond, river, and seashore. The arrangement of the book is systematic. Perhaps Miss Lulham would have been well advised not to have followed the order of the ordinary biological class-work, and to have abandoned microscopic Protozoa as an introduction to the subject; but intelligent teachers will be able readily to adapt the book to the needs of their own classes. Considerably more than half the book is devoted to the Arthropoda, and the account of the Insects is particularly well-done. The illustrations are generally good, but some of those especially drawn for the book are unequal in standard to others.

G. H. C.

NOTES.

BOTANY.

Mosses and Hepatics of Killarney.

In the *Journal of Botany* for June, 1913, D. A. Jones publishes an article on the Mosses and Hepatics of the Killarney district. A certain number of new records are included.

ZOOLOGY.

Clostera reclusa at Coolmore, Co. Donegal.

On May 18th a female of this species emerged from the pupa. I had taken the larva at Coolmore in September last. Several fine Puss Moths emerged during May and June from larvae taken at Coolmore. The males emerged first.

Poyntzpass.

W. F. JOHNSON.

A Gamekeeper's list of Undesirables.

The following is a list of vermin killed on the Curraghmore estate during the year 1912:—

Squirrels	..	..	826	Hawks	..	..	27
Rats	..	..	413	Cats	..	..	14
Rooks	..	..	271	Heron	..	..	17
Hooded Crows	..	..	132	Magpies	..	..	81
Jackdaws	..	..	123	Hedgehogs	..	..	8
Stoats	..	..	29	Cormorants	..	..	2

It will be seen that the Squirrels head the list by a large majority. They were killed during the months of the year as follows:—

January	..	..	47	July	..	..	11
February	..	..	45	August	..	..	76
March	..	..	27	September	..	..	91
April	..	..	65	October	..	..	102
May	..	..	7	November	..	..	145
June	..	..	15	December	..	..	195

I have been in this parish for many years, and only within the last few years the Squirrels have appeared, and since their coming have increased and multiplied in such numbers that they have now become a terrible scourge and pest. They are the most mischievous of our animals—eating birds' eggs, destroying young forest trees, and becoming a terror and dismay to the gardener. I have myself shot a good many in the garden here, but shooting appears to make no difference in their

numbers. They have come to this neighbourhood, and they are determined to stay. The Herons were shot because they devoured many Rainbow Trout. I am sorry for the Stoats, because they are good friends to man—particularly in their destruction of Rats. A few months since I was a spectator of a fight between a Stoat and a Rat; I watched it from only a very short distance. The Rat had no chance against its relentless assailant. Until I had witnessed the fight, I had no idea of the extraordinary ferocity and the marvellous quickness and agility of the Stoat. In a trice it killed its prey by a bite at the back of the neck. It then carried the Rat (a very large one) from one side of the road to the other. I interfered for a moment, and the Stoat left the Rat, but in a few seconds it appeared from a mass of briars, dashed out, collared its dinner, and was out of sight in a few seconds. It was a wonderful display of determination, adroitness, and skill.

Coolfin, Portlaw.

W. W. FLEMING.

Lesser White-throat at Rockabill.

On May 13th a Lesser White-throat (*Sylvia curruca*) was disabled striking at Rockabill lighthouse, Co. Dublin, and was forwarded to me in the flesh. It proved to be a male, and is the first spring occurrence in Ireland of this fairly common English breeding migrant. There are only two other Irish records, both from lighthouses in October. Careful observers may yet discover the Lesser White-throat breeding in this country.

Fassaroe, Bray.

RICHD. M. BARRINGTON.

Tree Sparrow in Co. Donegal.

Having read Dr. Patten's account in *British Birds*, July, 1913, of the breeding of the Tree Sparrow at Inishtrahull, it may be of interest to mention that I have discovered another Donegal colony of these birds, besides those already known. This colony, which I should estimate at twelve or fourteen pairs (but there may be more) inhabit a small fishing village on our north-west coast. Here Tree Sparrows may be seen nesting in company with House Sparrows in ivy growing over the walls of an occupied house, and in holes and crevices in the walls of outhouses in the village. I have seen a nest also under eaves, where Swifts were breeding. The birds are not shy, and can readily be identified.

Raphoe.

C. V. STONEY.

Recent Notes on Irish Birds.

Prof. C. J. Patten has published articles on "Robins on migration observed at the Tuskar Rock and Lighthouse" (*Zoologist*, Jan., 1913); "The diurnal migrations of certain birds observed at the Tuskar Rock (*Zoologist*, June, 1913); and "Discovery of a colony of Tree-Sparrows, on Inishtrahull Island, co. Donegal" (*British Birds*, July, 1913). Mr. R. Warren has published short notes as follows:—Sabine's Snipe and Great Northern Diver in co. Cork (*Zoologist*, Jan.); Stone-Curlew in co. Cork, Black-tailed Godwit living in a garden, and Ivory Gull at Cork (*Zoologist*, March); Greenland Falcon in Mayo, and Ivory Gull in Donegal (*Zoologist*, April); Greenland Falcon and Black-throated Diver in Mayo (*Zoologist*, June). Other recent short notes include:—Golden Oriole in Tyrone, and Greenland Falcon in co. Derry (W. C. Wright), and Lesser Whitethroat at Rockabill (R. M. Barrington), in *British Birds* for June; Whinchat breeding in co. Cork (J. H. Stenhouse), and Fulmar Petrel breeding on the Great Skellig (R. M. Barrington) in *British Birds* for July.

Fulmars and Great Shearwater on Tory Island.

After inspecting the Donegal colony of Fulmars, announced in 1911, I visited Tory Island in company with Dr. F. Lindner on 1st July, 1913. On the passage, while still a mile or more from the island, a Great Shearwater flew rapidly across the bows of our boat in a westerly direction, giving us ample opportunity of observing it about 30 yards off. It was alone, flying close to the water. On reaching the island we ascended the hill at the east end, and on the cliffs among the Razorbills we saw two pairs of Fulmars sitting, and one or more besides gliding in circles close to these. An islander who accompanied us said that these birds had just appeared "a month and a half" previously. This new colony just started is the second in Donegal, and the fourth or fifth known in Ireland; for on the Mayo coast eggs have been obtained on a precipitous island, though not far from the great cliff where I first saw Fulmars breeding in July, 1911. From Mr. Barrington I have learned of the new colony discovered this year on the Skelligs, co. Kerry; so that this species has established itself in the extreme north, the north-west, and the extreme south-west of Ireland, and may be looked for henceforth at any intermediate suitable point on the coast.

Cappagh, Co. Waterford.

R. J. USSHER.

SOME ADDITIONS TO THE NUDIBRANCH FAUNA
OF COUNTY DUBLIN.

BY NATHANIEL COLGAN, M.R.I.A.

Further exploration of the marine molluscan fauna of the inshore waters of County Dublin has shown that in one group at least our knowledge of that fauna is by no means complete. The dredgings and shore collectings of the past two years, carried on at Dalkey, at Malahide, and at Skerries, have added no less than eight species of nudibranchs to the fauna of the shores and shallow waters of the county, and brought up the Dublin total for this most interesting group to well over 40 species. The eight new species are the following :—

Aeolidiella Alderi.
Cratena amœna.
C. viridis.
Embletonia pallida.

Coryphella gracilis.
C. Landsburgii.
Tritonia plebeia.
Triopa claviger.

Three of these additions to the Dublin fauna appear to be additions at the same time to the fauna of Nichols's Irish Marine Province II., comprising the east coast from Carnsore Point north to St. John's Point in Down¹; another of the additions, *Embletonia pallida*, is apparently new to Ireland; and the remaining four species, though additions to the Dublin shallow-water area lying within the 3 miles limit from the shore line, have already been recorded for the deeper waters outside of that limit yet off the Dublin coast.

Brief notes, descriptive and critical, on these additional species are added here, references to Mr. G. P. Farran's "Nudibranchiate Mollusca of the Trawling Grounds of the East and South coasts of Ireland"² being distinguished by the contraction, Farran '09.

AEOLIDIELLA ALDERI (Cocks).—A single specimen, 30 mm. in length, was found under a stone at low water, Dalkey Island, on the 16th May of this year. At first I set this aside as a colour variety of the rather common *Eolis*

¹ List of the Marine Mollusca of Ireland. *Proc. R. I. Acad.*, 1900.

² Fisheries, Ireland; Scient. Investig., 1907, vi. [1909].

papillosa, but an examination of the radula brought to light the double-arched tooth characteristic of the neighbouring genus *Aeolidiella*, while the number of denticles, from 23 to 25, in each arch fixed the species as *A. Alderi*. From the only other well-established Britannic species of this genus, *A. glauca*, the present species is distinguished by the smaller number of its teeth (about 15) and of their denticles. A specimen of *A. glauca* 22 mm. long, which I dredged at Skerries two months later, gave a radula of 20 teeth with from 33 to 46 denticles in each arch.

Not previously recorded for the inshore waters of the county, but taken in Lambay Deep, 41-52 f. in 1907 (Farran '09).

CRATENA AMOENA (Ald. and Hanc).—This species occurred to me in four different dredgings off Skerries and Dalkey, a single specimen being taken in each of the following hauls:—(1) in 13 f. off Church Island, August, 1911; (2) in 14 f. off the same island in July, 1913; (3) in 2 f. off Colt Island, Skerries, July, 1913, and (4) in 14 f. to the south of Dalkey Island, July, 1913. The largest specimen was 6.5 mm. in length. All four agreed closely in form with Hancock's figure in the "Monograph," and all bore the brown band there shown on the rhinophores; but in none was the colour of the papillae so distinctly green. It varied from dull brown to sage green. The radula agreed with the figure in the "Monograph" ("Tongues of the Eolididae") the number of teeth in the 5 mm. specimen examined being 16.

Not previously recorded for East Ireland.

C. VIRIDIS (Forbes).—Twice dredged off Church Island, Skerries, in from 13 to 14 f., once in August, 1911, when 4 specimens were taken, the largest 6 mm. in length, and again in July, 1913, when a single specimen was taken, 5 mm. long. In form and colour all of the specimens agreed closely with Hancock's plate of the species in the "Monograph." The radula of the 5 mm. specimen was examined, and this, too, agreed well with Hancock's figure in his plate "Tongues of the Eolididae." It was long and slender, and made up of 30 teeth, each with about 5 denticles on

either side of the median denticle which was but slightly prominent.

Though not previously recorded for the Dublin inshore waters, this species was several times dredged in the Irish Sea off the Dublin coast, in from 20 to 53 f. (Farran '09).

EMBLETONIA PALLIDA (Ald. and Hanc.).—In August, 1911, while examining some hydroids collected off Shennick's Island, Skerries, I detected two specimens of *Embletonia*, one 2.5 mm., the other under 2 mm. in length. They were associated with *Galvina exigua* and *Tergipes despectus* on *Obelia dichotoma*. The larger specimen had a double row of papillæ on either side of the body, those towards the central part much longer than the others. The papillæ were yellow with orange tips. The second and smaller specimen was pale whitish yellow in colour, and bore only a single row of papillæ on either side. The first agreed in form and size with Alder's original description of *E. pallida* (Jeffreys' Brit. Conch., v., 1869), and differed only in its brighter coloration from Hancock's figure of that species given in Part VIII. of the "Monograph¹"; the second agreed perfectly with the figure in colour while differing in the absence of a second row of papillæ. Both specimens were lost before I had had an opportunity of examining the radula, but the larger, at least, may be safely assigned to *E. pallida*. The smaller individual may, perhaps, have been an immature state of the same species with imperfectly developed papillæ. Apparently new to Ireland.

CORYPHELLA GRACILIS (Ald. and Hanc.).—This elegant little nudibranch occurred to me in no less than six dredgings in July of this year, a total of 11 specimens being taken, ranging in length from 3 to 6 mm. Ten specimens were taken in 5 hauls off the Skerries islands in from 2 to 15 f., and one in 14 f. south of Dalkey Island. The coloration was the same in all of the specimens, the papillæ being rather a clear orange than the reddish brown tint shown in Hancock's plate in the "Monograph." In all other respects the specimens agreed perfectly with that plate.

Not previously recorded for East Ireland.

¹ "British Nudibranchiate Mollusca," part viii. (Supplementary). By Sir C. Eliot. *Ray Society*, 1910.

C. LANDSBURGII (Ald. and Hanc.).—A single immature specimen of this, perhaps the most beautiful of all our Eolids, was taken in 2 f. in Malahide River, in September, 1911, on one of the Dublin Field Club excursions. It measured 5.5 mm. I secured a second, mature, specimen 20 mm. in length, in a dredging in 7 f. in Dalkey Sound, in May of the present year. Both specimens agreed perfectly with Hancock's excellent plate in the "Monograph."

Not previously recorded for the Dublin shallow-water area, but dredged four times in the Irish Sea, off the coasts of the county, in from 19–24 f. (Farran '09).

TRITONIA PLEBEIA (Johnston).—In July, 1912, four individuals of this species, the largest 18 mm. in length, were detected nestling at the foot of a large specimen of *Alcyonium digitatum* attached to an old Pecten shell which I dredged in 14 f., off Church Island, Skerries. This association of the Nudibranch with the Coelenterate has been frequently noticed. It is a doubtful instance of commensalism, for the Tritonia probably lives not only with, but on the Alcyonium.

I can find no record of this species for the Dublin inshore waters, though it has been taken several times off the shores of the county, but outside of the 3-mile limit (Farran '09).

TRIOPA CLAVIGER (Müller).—A single specimen 11 mm. long, and agreeing perfectly with Hancock's plate in the "Monograph," occurred to me on the 18th July of this year in a dredging made in 2 f. in the channel between Colt Island and Church Island, Skerries.

This appears to be the first record for Dublin waters, and for the Irish Marine Province II.

The results here recorded justify the hope that continued exploration will yield further additions to the Nudibranch fauna of the Dublin inshore waters, for many species of the group already recorded for our Irish coasts still remain desiderata in the Dublin list.

NOTES ON DUBLIN OLIGOCHAETS.

BY REV. HILDERIC FRIEND.

During the month of March, 1913, I spent ten days in Dublin, and took advantage of the opportunity to push forward the study of the indigenous annelids. As Southern has shewn (1)* it is many years since the subject first occupied my attention. My own researches (4) were followed by those of Southern (2), who, in 1908 stated that about 60 species of oligochaets had already been found in the district, and estimated that probably not far short of 200 might be found. It is proposed in the present paper to give a topographical and chronological summary setting forth the general results of my investigations, reserving the systematic and complete list of species found for a second article.

I had the good fortune during my stay in Ireland to be the guest of Mr. E. W. Booth, B.A.I., of Herbert Park, Donnybrook, who gave me every assistance in my work, and indicated the spots where research might be rewarded. I opened my campaign on March 6th by visiting the banks of the Dodder, and in a very short time found myself in a most prolific hunting ground. The first annelid to greet me was my old friend *Lumbricus papillosus* which has been renamed *Lumbricus Friendi* Cognetti. For twenty years I have sought it in vain in England, and as the search has been carried out in almost every part of the country, there seems good reason to believe that it is not English at all. In the light of Dr. Scharff's researches (6), and the interesting statements of Taylor (7), this is an important fact. It is also to be noted that *L. terrestris* L. is often rare or wanting where its near ally is abundant. All the five species of *Lumbricus* were found by the Dodder, but no new addition was made to the genus, and it almost seems as if the British species were limited to these. But among the Allolobophoras, using the term to include all the genera and sub-

* The numbers in brackets refer to the Bibliography.

genera of indigenous Lumbricidae not included in *Lumbricus* and *Allurus* (*Eiseniella*), good work still remains to be done. It was a great delight to come across such a species, for example, as *Helodrilus oculatus* Hoffmeister.

This curious annelid has had a rather romantic history. First discovered and described in 1845, it was for nearly half a century lost to sight, just as *Lumbricus festivus* was till I rediscovered it in Yorkshire. In 1890 Michaelsen found *Helodrilus* and named it *Allolobophora Hermannii* ⁽⁸⁾ and it was some time before one learned that the two names referred to one and the same worm. As time went on it was discovered by Mr. Evans near Edinburgh, and by myself at Cambridge. In 1908 I found it in Malvern, but though it was under observation for two years, an adult was never found. Since that time, however it has been collected by me in Sussex, by the Thames at Kew, in Epping Forest, Oxfordshire, Derbyshire, Notts, and elsewhere, and now its most westerly record is Co. Dublin. It occurs in the mud by the side of rivers, streams and pools, and extends to the shore, often living within the reach of the tide.

Numerous well-known forms such as the Green Worm (*A. chlorotica*), the Square Tail (*Allurus*), the Long Worm (*A. longa*), and several species of *Eisenia* and *Dendrobaena* also occurred. The Brandling (*E. foetida*) and the Mucous Worm (*E. mucosa* = *rosea*) were here, with the Gilt-tail, the Tree Worm and others. But no fewer than three other species of *Allolobophora* were found which were new to Ireland as well as to Great Britain, and possibly one or two may prove to be new to science. It is impossible to give details here, as the material has yet to be re-examined, but there seems not the least reason to doubt that *A. norvegica* is among the number. The proofs will be supplied in the next paper.

Passing from the larger forms it may be remarked that among the Enchytraeids, several very interesting things were found. While *E. albidus* Henle proved to be the dominant type, *E. minimus* Bret. was also abundant. This is a very tiny species, many specimens not exceeding 2 mm. in length, and is not to be confused with *E. turicensis* Br. of which

Southern has given an account (2). In the mud left by the tide, I found a species of Pachyroid which agrees very closely with *Marionina georgiana*, which I have already taken in England. Typical *Fridericia bulbosa* also occurred. This is one of the variable species of *Fridericia*, hence the qualification.

Well pleased with my first day's work, I turned inland on Friday, March 7th, and examined the district to the south-west of Donnybrook, giving special attention to the earth by the side of the Dundrum road. Here the usual Lumbricids were abundant, including such forms as *L. terrestris*, *L. rubellus* and *L. castaneus*, with *A. longa*, *A. chorotica*, and *A. caliginosa*. The Gilt-tail (*Dendrobaena subrubicunda*), Brandling, and the interesting form once known as the Celtic Worm (*A. celtica*), but now recognised as *D. mammalis*, were not uncommon. In the damp soil by the runnels, Allurus was abundant, but I could not find anything save the typical form. There were one or two Tubificidæ and numerous Enchytraeids, including *Henlea Dicksoni* and a species new to science.

March 10th was spent by the side of the canal between Leeson Park and Phoenix Park. The worm which was years ago found in Dr. Scharff's garden at Leeson Park, and named *Eisenia hibernica* was re-discovered in a heap of garden refuse. Vast numbers of *Enchytraeus minimus* and *E. albidus* were also met with, and a species of *Buchholzia* which was in no instance mature. Here, too, *Achaeta bohémica* was plentiful, as were *F. bulbosa*, *E. Buchholzi*, and other Enchytraeids. In a ditch beyond Portobello, as well as in the mud by the sides of the canal, *Tubifex* was found. It was not common in my gleanings, but two species of *Limnodrilus* occurred, viz., *L. Hoffmeisteri* and *L. udekemianus* and a species of *Ilyodrilus*. Two cocoons of *Limnodrilus* full of eggs were in fine condition. The usual earthworms were found, including *Allurus*, and some species of *Fridericia*.

On the 11th I visited Sandymount, but was unable to find *E. sabulosus* described by Southern as occurring there. Returning by the canal, which had proved very productive,

I again found large numbers of *E. albidus* in a bit of old sacking ; *Achaeta bohémica*, *E. minimus* and *D. mammalis* abounded among the roots of *Petasites fragrans* which bind the banks of the canal together, and several species of *Henlea* and *Fridericia* came to hand. I may mention *F. bulbosa* and *F. Michaelseni* as the most common. *F. paroniana* also occurred, while the *Henleas* included *H. parva*, *H. tubula*, *H. glandulosa*, *H. rhaetica*, *H. perpusilla* and *H. Dicksoni*. A form which may, perhaps, be allied to *H. tenella* occupied my attention, and a new species with only two setae per bundle. I could not find *H. hibernica* Southern, but since my return to England both *H. bisetosa* and *H. hibernica* have been found in the environs of Nottingham.

On Wednesday, March 12th, Mr. R. Booth, J.P., of Dalkey motored me to St. Douloughs, Malahide, and Swords. It had been my wish to explore the spots which Dr. Turnbull found so rich in annelids in former years, but it was impossible to get everything done in the course of a few hours. Interesting things were found close by the old cross at our first stopping place, St. Douloughs, the most pleasing of which, perhaps, was *F. aurita*, a species which Southern had already reported as occurring at Bray Head and Lambay, though I had never been able to find it in England. Close to the bridge at Swords, *Helodrilus oculatus* was again found, and among the specimens at least one was adult, and showed the characteristic pores on segment 15 as well as the girdle. Sundry Tubificids were also found in the mud, but I was unable during my visit to obtain any traces of *Nais* and its allies, or of the different forms of *Stylodrilus* or *Lumbriculus*.

In some respects my most successful search was made on March 14th when Ringsend was visited, and a return made by the productive banks of the Dodder. Many of the species already enumerated were found again, including most of the earthworms. In the decaying Algae in the corner under the sea wall, two or three species of *Pachydridilids* were found. This group is a difficult one, and as far as my experience goes much revision is necessary. It

is hoped, however, that in the systematic portion of this study it will be possible to give the exact descriptions and names.

The species of annelid found at Ringsend which gave me the greatest pleasure, was a peculiar Tubificid with *Pachydrilus*-like setae. Full particulars will be supplied later, but it may here be remarked that I have found the same species on the east coast of England, and have been led to believe that it is identical with the *Lumbricus lineatus* of the earlier authors. It is quite distinct from *Lumbricillus lineatus*, a true Enchytraeid which is found in similar localities. The Ringsend specimens contained at least one adult. It is found by digging in the moist sand, and might easily be mistaken for *Clitellio* or one of the other estuarine forms of annelids.

Enough has been said to shew that a number of additions will be made to the annelid fauna of Dublin, as a result of my visit. One might hope for great things if other districts could be explored in the same systematic way.

BIBLIOGRAPHY.

1. SOUTHERN : In Handbook of Dublin District, 1908, pp. 197-9 (prepared for Brit. Assoc.)
2. ——— : *Proc. Roy. Ir. Acad.*, XXVII. Section B., 1909, pp. 119-182.
3. ——— : *Irish Naturalist*, 1906-7.
4. FRIEND : *Irish Naturalist*. 1893 and following years.
5. ——— : *Proc. Roy. Ir. Acad.* (3) Vol. II., 402, 453.
6. SCHARFF : The History of the European Fauna.
7. TAYLOR : Dominancy in Nature, 1913. Pres. Address, Yorks. Nat. Union.

MICHAELSEN : *Oligochaeta. Das Tierreich*, 1900.

Pocklington, York.

SOME NOTES ON THE MIGRATION OF THE
WHITE WAGTAIL ON THE ISLAND OF
BARTRAGH, KILLALA BAY.

BY ROBERT WARREN.

Up to the time of the publication of Wm. Thompson's "Birds of Ireland," there is no authentic record of the capture of this bird (*Motacilla alba*) in Ireland. All Thompson knew was from a letter received from his friend the late Mr. R. Ball of Dublin, stating that a few days before, at Roundwood, he had seen a specimen of the true *M. alba*, as distinguished from *M. Yarrellii*; this is all the meagre information at that time in Thompson's possession.

Regarding the regular visits of this bird on its northern movement to Bartragh, there can be no doubt of its regular line of flight northwards across that island, in proof of which we have the facts of its yearly visits from 1897 up to and including this present year 1913, when on the 24th of April, my friend Captain Kirkwood observed four birds on the island, and on the 28th he saw several others.

I first met this bird on the 25th April, 1851, on the island of Bartragh, feeding after the harrows of a man sowing oats. My attention was first attracted by its quiet movements, as it walked after the harrows, so different from the quick jerky, fussy action of the Pied Wagtail when feeding; also its very white cheeks, and light grey back, showed me it was a stranger, and it suddenly occurred to me that it was the rare *Motacilla alba*, so changing the shot in my gun for No. 8, I waited until the bird came round again after the harrows, when I knocked over the first specimen of *Motacilla alba* known to have been shot in Ireland.

The very white cheeks and light grey back at once identified it by the woodcut in Yarrell's "British Birds," that I had seen two years before in Belfast. I at once sent on the specimen (by post), to my old and valued friend the late Dr. J. R. Harvey, of Cork, for his fine collection of Irish birds, but very unfortunately, it was so long delayed in transmission through the post office that it

reached Dr. Harvey so far gone as to be quite unfit to be set up as a mounted specimen, or even for keeping as a skin. However, he verified my opinion as to its being *M. alba*.

Thinking that this bird was a mere stranger and not a regular visitant, neither my brother nor I took any thought about it, never expecting to see another, and it was not until the 29th of April, 1893, that I renewed my acquaintance with White Wagtails. I had taken with me in my boat two young friends to see the birds on Bartragh, and when walking across a damp flat of pasture, I observed a White Wagtail feeding. Taking my glass to make sure, I pointed out the bird to my friends, and at that moment it was joined by a companion, but where it had come from I did not know. However, taking my gun, and quietly approaching within range I fired, and obtained the second *M. alba* taken in Ireland. The specimen is now in the collection of the National Museum, Dublin. Before leaving the island, I showed the specimen to my young friend the late Mr. A. C. Kirkwood, asking him to keep a sharp look-out for any other visitors. But it was not until April, 1897, that he met a solitary bird feeding near the place where I had shot the specimen in 1893. Recognising the bird as a White Wagtail, he returned for his gun, but in the meantime, a heavy shower of rain had driven the bird to seek shelter, and it had disappeared when he came up to the place. However, next season, on the 29th of April, 1898, he was more successful, when he met five birds feeding in a newly-sown oat field, his glass showing that they were White Wagtails. This party left the island, but on the 10th May, they were replaced by a flock of fifteen birds. He saw them resting on the slope of a little hillock, but on his approach, rising, they fled to the shore among the rocks and stones; they only remained until the afternoon when they all disappeared. But on the 19th, they were replaced by five others, on which day I had the pleasure of seeing them near the paddock on the island. Mr. Kirkwood saw a pair on the 26th and the date being so late, he thought they were remaining to breed. However, he was mistaken, for, before the 1st June, they also disappeared.

On April the 27th, 1899, Mr. Kirkwood saw a solitary bird in the stable yard at Bartragh, and secured the specimen for a friend's collection. A few days after he met another bird at the same place, but it remained only a few days. These were succeeded by a pair seen on the 4th of May, picking up insects from a manure heap in the farm yard. These birds only remained for a couple of days, until they had fed and rested. Some seasons very few birds appear, for their presence depends on the weather ; their stay on the island also depends on the state of the winds ; for instance, in 1910, they visited Bartragh in unusually large numbers, and, owing to long continued northerly and north-westerly winds, their flight was delayed until a favourable change to the south permitted it. The first arrival of their advance guard was led by a pair seen on the 5th of May, afterwards single birds began to drop in ; on the 8th a flock of five were seen, next day more appeared, and on the 12th, a flock of 25 birds were seen feeding on their usual haunt. Some of them disappeared, but on the 14th, 22 were counted feeding on the wet pasture. However, as the wind was changing to the south, by the 19th only a solitary individual remained on the island. In 1912, another rush of birds took place. On April the 25th Captain Kirkwood observed a flock of fifteen or sixteen that remained on the island for three days, until the gale of northerly wind (blowing on their arrival) subsided, and changed round to south-west, when they all disappeared. The favourite feeding and resting ground of these birds on the island, is a damp sandy flat, growing a short coarse grass, situated at the back of the garden, and extending from the shore of the estuary up to the foot of the sandhills, and if any birds are on the island, they are sure to be met on or near it.

It will be seen on the map that Killala Bay opens to the north, and is about eight miles across from Kilcummin Head, its western boundary, to Lenadoon Point, its eastern boundary on the Sligo coast. The bay extends into the land for nearly seven miles, when it is met by the island

of Bartragh—a range of sandhills—about three miles in length, stretching right across the bay, and forming a breakwater sheltering the estuary from the frequent northerly winds sweeping up the bay. The river Moy has access to the bay by a narrow channel between the sandhills of Bartragh and those of Enniscrone on the Sligo side, while on the Mayo side, the little Moyne channel running out by Killala separates it from the Ross sandhills.

The bay, stretching out north, as I may say, opens its arms to receive any storm-worn birds, which gladly take refuge on the sandhills, or on the sands or calm water of the estuary. We have had two Greenland Falcons on the island sandhills and after a severe snowstorm a Snowy Owl was seen there also. Then during the same storm, fourteen Snow Geese rested on the sands. Bewick's Swans often rest on the sands. Eider Ducks have been shot, and a pair of American Surf Scoters.

Up to 1854, a pair of White-tailed Eagles every winter took up their abode on the sandhills, but owing to the traps and poison of the game preservers and mountain shepherds, the days of the eagles have passed away.

Monkstown, Co. Cork.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Cheetah from Capt. H. C. Dobbs, two Civet Cats from Rev. E. T. Pakenham, a Fox from Dr. Dwyer, Guinea-pigs from Mrs. Biddulph and Mrs. Gafter, Rabbits from Messrs. R. & H. Brown, a Black Rat from Messrs. T. & C. Martin, eight Waxbills from Mrs. Carden, a Sparrow-hawk from Mr. Donohue, four Kestrels from Mr. R. White, a Barn Owl from Mr. H. J. Johnson, and two Toads from Miss Wingfield. A young male Chimpanzee, a pair of good-sized Orang-utans, a Slow Loris, and three Marmosets, a Marabou Stork, and a pair of White Storks have been purchased. A Zebra foal and two Lion cubs have been born in the Gardens; the Zebra is a Grant-Burchell hybrid, and the parents of the young lions are "Conn" and "Mitze."

NOTES.

ZOOLOGY.

Notes from the Skelligs.

I have received a letter from Mr. P. J. MacGinley, light-keeper on the Great Skellig, dated 1st August, in which he writes :—

FULMAR.—“The colony of Fulmars have left the rock (on the 25th July) and have taken nine young ones with them. Possibly there may have been one or two more.”

RAZORBILL, GUILLEMOT.—“The young Razorbills and Guillemots are nearly all gone also, and the Kittiwakes are practising their short flights, having left their nests. It is about 25 minutes after sunset that the Razorbills and Guillemots take their young to sea, of a clear evening later; where the cliff is overhanging they just edge the young one over to the extreme edge, and then give him a gentle shove off. No matter how high the nest, once the young bird is off he keeps fluttering all the time in mid air, sufficiently to maintain his balance; he never tumbles. While he is dropping into the water he is screaming, and so are the older ones, making an awful row, but only for the time till they have him safe in the water. When he touches it he instantly dives once only with the older ones, then he strikes out for sea with the parents on either side; then to sea they go as fast as they can swim, but I have never seen the young bird dive except when touching the water. This dive is but for a few seconds only.

“In the case of the nest not overhanging, the young one is carried out caught by the wing, and as soon as they have him clear of the cliff, they let him go; they only take him clear which they are able to judge to a nicety.

“It is possible they leave at sunrise, or the early hours of the morning, but it is mostly in the evenings I see them going.

“To make this matter clear. I have seen them take the young at any height from 40 to 100 feet, and never saw the young bird tumble, or touch the water in an awkward manner; he is fluttering all the time and maintains his balance. The first I noticed leaving the rock was on the eve of the 27th of July, once they start they are all cleared out in a week.

GANNET.—“As regards the Gannets on the Little Skellig, it is literally covered with them, and they are increasing in numbers every year. From the highest point of the rock, which is close on 500 feet, to within 16 feet of high water, they are nesting, and have spread all over the rock. They have reduced the numbers of other birds as far as possible, but there are two large caves or overhanging cliffs with very narrow shelves or ledges where other birds still breed. On these shelves it would not be possible for the Gannet to rest, but it is the only spot on the rock where they are not, and the others have it to themselves undisturbed by the Gannets, though they are only a few feet overhead.”

As to the way in which the young Guillemots are brought down from the cliffs, I have not had opportunity of observing this myself, but it is evident that when this is done in the evening, there is less risk of attacks from the larger gulls, the great enemies of the Guillemots, which are fast driving them from the Saltee Islands by the continued plunder of their eggs.

Mr. McCarron, a former light-keeper, gave an account of his observations of the young Alcidae descending to the water, which differs in several particulars from the above, but as I am from home I cannot now refer to it.

R. J. USSHER.

Cappagh, Co. Waterford.

BOTANY.

A new *Alisma* Hybrid from Ireland.

In the "Botanische Centralblatt" for 1913, Abt. ii., in a paper on hybrids among the Alismaceae, Professor Hugo Glück describes and figures *Echinodorus ranunculoides* x *Alisma Plantago*, from a specimen collected near Tuam by R. Ll. Praeger in 1899. A search recently made in the locality by Professor Glück for further specimens was not successful, but the district is a wide one. The allied hybrid *A. Plantago* x *E. ranunculoides*, nearer to *A. Plantago* than to its other parent, is also described and figured. Professor Glück found it at Killower (the place where the other hybrid was obtained), and also subsequently in Anglesey; and he has seen a specimen in the herbarium of Rev. E. S. Marshall, collected by that botanist in Scotland.

Sprianthes Romanzoffiana in Co. Armagh.

Mr. N. Carrothers sends a couple of specimens of this orchid, gathered by him on the Armagh shores of Lough Neagh. He says the plant extends for a mile along the shore west of the Pumping Station, and that he counted fifty specimens close together. The continual discoveries of this extremely rare plant—in Europe confined to a few Irish counties—is one of the most interesting and pleasing features of recent botanical field work in Ulster.

R. LL. PRAEGER.

Dublin.

REVIEW.

The British Parasitic Copepoda. By THOMAS SCOTT, LL.D., F.L.S., and ANDREW SCOTT, A.L.S. Volumes I. and II. Copepoda Parasitic on Fishes. London: Ray Society, 1913. Vol. I., xii + 256 pp., 2 pl. Vol. II., xii. + 144 pp., 72 pl. Price 40s. net.

It is thirty-three years since the appearance of the last volume of Professor Brady's Ray Society Monograph of the free and semi-parasitic Copepoda of the British Isles. The present volumes, dealing with the Copepoda parasitic on fishes, continue the account of the Order and, though the interval has been a long one, those to whom they are now available have no reason to complain of the delay since it has allowed the authors to deal very fully with their subject, and has given them an opportunity of personally observing almost all the species described.

The first volume contains the letterpress, the second, of almost equal size, the plates. The figures, which, with very few exceptions, have been drawn by Mr. A. Scott from the actual specimens, seem to contain everything necessary for the identification of the species.

The introduction gives a general account of the morphology and habits of the two orders Caligoidea and Ternaioidea, as exemplified by *Lepeophtheirus* and *Lernaea*. It may be noted that the authors, in describing the appendages of the Caligidae, adhere to the nomenclature put forward by Mr. A. Scott in his Liverpool Biological Society memoir on *Caligus*, and afterwards adopted by Mr. C. B. Wilson in his papers on the same family. They do not, however, refer to the difficulty which arises in comparing this arrangement with that found throughout all the rest of the Copepoda.

In the systematic section, the authors, though alluding to this usual practice, have not attempted to revise any of the previously published classifications but have followed that adapted by Basset-Smith from Gerstaecker. The 116 species of fish parasites which are described are arranged under the Cyclopoidea, 5 species, the Caligoidea, 49 species, and the Ternaioidea, 61 species, the single British representative of the peculiar genus *Ayulus* usually reckoned amongst the Copepoda, making up the total. Two species of *Tevella*, which are parasitic on whales and hence do not come within the somewhat artificially restricted scope of the Monograph, are briefly referred to.

It appears from the title that a further volume, dealing with Copepoda parasitic on animals other than fishes, may be expected, though there is no definite statement to this effect. It is to be hoped that the expectation will not be disappointed.

G. P. F.

NOTES ON THE FLORA OF THE SALTEES.

I. PHANEROGAMIA.

BY R. LLOYD PRAEGER.

THE Saltees are a group of two islands lying off the south coast of Co. Wexford. The larger, the Great Saltee, is slightly over a mile in length, by about $\frac{1}{4}$ mile in breadth, the longer axis running S.W. Its area is 216 acres. It is separated from Kilmore Quay, the nearest point of the mainland, by $3\frac{1}{2}$ miles of sea. The smaller island lies about a mile nearer shore, and has an area of 93 acres. The islands lie on a submarine ridge which is clearly traceable from Kilmore for some 10 miles to the south-westward, and, without doubt, they formed part of the mainland in recent geological times.

The Great Saltee presents on the landward (N.W.) side a long monotonous beach of angular boulders, backed by a low weed-grown scarp of boulder-clay. Thence the ground rises south-eastward to the opposite coast, distant about $\frac{1}{4}$ mile, which is bold and precipitous. The two extremities of the island are high, and there the ground descends steeply on the S.E. side for nearly 200 feet into the sea. The middle part of the island is lower, and there the cliffs are about 100 feet in height.

Our knowledge of the flora of the Saltees rests on a one-day visit made by H. C. Hart, in 1882, when exploring the flora of the Wexford and Waterford coasts.¹ On that occasion, he visited both islands, and made a list of plants (153 species) which, considering the short time at his disposal, was singularly complete.

In the middle of last June, in company with R. J. Ussher, R. M. Barrington, Canon Lett, and several others, I spent six days on the Great Saltee—our intention of visiting the

¹ Report on the Flora of the Wexford and Waterford coasts. *Sci. Proc. R.D.S.*, iv., pp.117-146. 1883.

smaller island being frustrated by bad weather. In the present paper, I shall deal with my observations on the Flowering Plants and their allies; notes on the Mosses, Hepatics, Lichens and Marine Algae, as collected by Canon Lett or myself, follow.

Assuming a tolerable completeness in Hart's list—an assumption justified by my own observations—considerable interest attaches to the study of the present-day flora on the following account:—At the time of his visit, and up till ten years ago, the island was inhabited. Some 80 acres were under tillage, and cattle and sheep grazed all over the higher rocky grounds at either end. At that time the extensive colonies of breeding sea-birds, for which the island has long been famous, were practically confined to the inaccessible slopes and cliffs. The Rabbits also, introduced at some bygone time, were kept in check by trapping.

The withdrawal of man and of cattle ten years ago, has resulted in striking changes in the distribution of both animals and plants. The Puffins, Razorbills, and Guillemots have moved up, and now occupy broad slopes and even flat ground formerly grazed. The Herring-Gulls, which have increased enormously in numbers, and the Lesser Black-backed Gulls, have occupied—one or other of them—nearly the whole of the two high ends of the island, including large areas of former pasture. Manx Shearwaters have even invaded the farm-land, and breed in holes in the earth and stone fences. The Bracken has swept in forests across the former grazing-lands occupying the two high ends of the island. At the same time, the spread of the vegetation has been much influenced by the fauna. The large area of former tillage which occupies the middle parts of the island has been completely invaded mainly by indigenous plants, but these are cropped down to the closest possible sward by the innumerable Rabbits. The birds control the vegetation inhabiting their vast colonies, beating out certain species, and permitting the growth only of those which can withstand the guano and continual trampling. The facies of the flora has thus

been greatly altered since Mr. Hart made his list, and furnishes a very interesting study.

Some of the leading types of the vegetation, as it now exists, may be briefly described. To take first the area which was never under cultivation, but much of which was grazed. At the Puffin colonies at the S. and S.W. margins of the island, a pure sward of *Spergularia rupestris* occupies conspicuous areas. Above this, at both ends of the island, where rocky ridges and knolls stand up and innumerable gulls breed, *Silene maritima*, often quite unmixed with other species, forms the vegetation, presenting at the time of our visit a most characteristic colour and appearance, visible from a long distance. Where the soil is deeper, great sheets of *Rumex Acetosa* and *R. Acetosella*, exceedingly luxuriant, are often dominant, plentifully mixed in places with *Holcus mollis* and *Scilla nutans*. Where the bird population is thinner, *Pteris Aquilina* becomes dominant, growing very tall and dense, and sheltering vast quantities of *Scilla nutans*, which forms a continuous undergrowth over many acres. All over the island, in both the untilled and formerly tilled areas, one is struck by the bold grouping of the plants, associations covering wide areas being formed almost exclusively of two or three or four species. Some of these present rather unexpected groupings. Among the best-marked associations of the *Pteris* formation are:—

1. *Pteris Aquilina* + *Scilla nutans*.
2. *Pteris Aquilina* + *Scilla nutans* + *Rumex Acetosa* + *Nepeta Glechoma* (a common type).
3. *Pteris Aquilina* + *Hydrocotyle vulgaris* + *Scilla nutans*.

To turn to the area formerly cultivated; this presents a great contrast to the rank vegetation of the rest of the island. The old fences, and the clay slope that fringes the long straight N.W. coast of the island, are indeed occupied by a luxuriant coarse vegetation—thistles, docks, nettles, and Ragwort. But elsewhere the vegetation invading the old cultivation is often as close as if a lawn-

mower had passed over it. This Rabbit-work gives a great opportunity to species which are not eaten by that voracious quadruped. Hence the thickets of weeds just mentioned; and hence also the remarkable development of certain smaller species. *Potentilla Anserina*, for instance, occupies whole fields, with a dense undergrowth of *Sagina procumbens*; *Carex arenaria*, which is found all over the island in spite of a complete absence of sand, often forms patches half an acre in extent, to the exclusion of almost every other plant. *Erodium maritimum*, also, which is immensely abundant all over the island, occupies certain areas exclusively. The only place where anything approaching sand is found is at the stony hook-shaped point inside of the curved boulder-shoal known as "The Ring." Here much comminuted shell-material occurs. It is colonized by a dense growth of *Cochlearia danica* and *Erodium maritimum*, with *Atriplex* sp. and *Matricaria inodora*.

There are several springs on the island, which here and there form pools; but these are so much frequented by gulls that vegetation in them is almost *nil*. The marsh-plants occur mostly in ditches by which the water from the springs soaks down towards the sea.

Hart's list of the flora, as already stated, numbers 153 species. Fourteen of these, listed below, he noted only from the Lesser Saltee; five of them (marked G), I saw on the Great Saltee:—

Medicago lupulina.	G Juncus Gerardi.
Spergularia media.	G Carex arenaria.
G Oenanthe crocata.	C. extensa.
Petasites vulgaris.	G Aira caryophyllea.
Leontodon hirtus.	Agropyron repens.
G Samolus Valerandi.	Glyceria maritima.
Polygonum aviculare.	Equisetum maximum.

I shall now list the whole flora (Phanerogamia and allies) of the Great Saltee as at present known, postponing the question of their standing as natives or otherwise, but adding by means of familiar contractions (l=local) their

relative abundance. Two plants in Hart's list which he records with doubt (*Hedera Helix* and *Rubus villicaulis*) are omitted; on the other hand, 60 species (marked P) were seen by me which are not given by Hart; of the plants in his list, 30 (marked H) were not found by me.

Ranunculus hederaceus, r.	H Trifolium pratense
Flammula, f.	repens, c.
acris, r.	dubium, f.
repens, c.	Lotus corniculatus, c.
P parviflorus, v.r.	uliginosus, f.
P Ficaria, c.	H Vicia Cracca
P Fumaria confusa, v.r.	sepium, r.
H officinalis	H Lathyrus pratensis
P Nasturtium officinale, v.r.	P Rubus leucostachys, r.
P Cardamine pratensis, f.	P nemoralis, r.
H hirsuta	Potentilla Tormentilla, r.
Cochlearia officinalis, c.	P procumbens, r.
P danica, c.	Anserina, v.c.
P Brassica Rapa, l.c.	P Alchemilla arvensis, v.r.
P Sinapis arvensis, v.r.	Cotyledon Umbilicus, c.
H Raphanus Raphanistrum.	Sedum anglicum, c.
Viola Riviniana, c.	Callitriche stagnalis, f.
P canina, f.	P pedunculata, f.
H tricolor	Peplis Portula, v.r.
H Polygala vulgaris.	Lythrum Salicaria, f.
Silene maritima, v.c.	P Epilobium obscurum, v.r.
P Cerastium tetrandrum, c.	Hydrocotyle vulgaris, v.c.
glomeratum, r.	Conium maculatum, r.
triviale, f.	P Apium nodiflorum, f.
Stellaria media, c.	P Sium angustifolium, v.r.
P uliginosa, v.r.	Crithmum maritimum, r.
P Sagina apetala, v.r.	P Oenanthe crocata, v.r.
maritima, c.	Heracleum Sphondylium, f.
procumbens, v.c.	P Sambucus nigra, v.r.
H Spargula arvensis	H Lonicera Periclymenum
Spargularia rupestris, v.c.	P Galium saxatile, f.
P Montia fontana, c.	palustre, r.
Hypericum elodes, v r.	Aparine, r.
Radiola linoides, r.	Sherardia arvensis, v.r.
Geranium molle, r.	Bellis perennis, c.
H dissectum	Aster Tripolium, c.
P Erodium cicutarium, v.r.	Gnaphalium uliginosum, f.
maritimum, v.c.	Inula crithmoides, r.
Ulex europaeus, l.	Pulicaria dysenterica, r.

- H *Anthemis* Cotula
 H *Chrysanthemum* segetum
 Matricaria inodora, c.
 P *Artemisia* vulgaris, v.r.
 Tussilago Farfara, r.
 H *Senecio* vulgaris
 Jacobaea, v.c.
 P *aquaticus*, r.
 Arctium minus, r.
 Carduus pycnocephalus, v.r.
 P *lanceolatus*, c.
 palustris, c.
 arvensis, c.
 Centaurea nigra, r.
 P *Lapsana* communis, v.r.
 H *Hieracium* Pilosella
 Hypochaeris radicata, r.
 H *Leontodon* autumnalis
 Taraxacum officinale, r.
 Sonchus oleraceus, r.
 P *asper*, r.
 arvensis, r.
 H *Jasione* montana
 Calluna vulgaris, r.
 Erica cinerea, r.
 Armeria maritima, c.
 Anagallis arvensis, f.
 tenella, f.
 P *Centunculus* minimus, v.r.
 P *Samolus* Valerandi, r.
 Erythraea *Centaureum*, f.
 H *pulchella*
 Symphytum officinale, r.
 Myosotis *arvensis*, v.c.
 P *collina*, v.c.
 P *versicolor*, v.c.
 H *Linaria* *Elatine*
 P *Veronica* *hederaefolia*, v.r.
 H *agrestis*
 P *Tournefortii*, v.r.
 P *arvensis*, r.
 serpyllifolia, r.
 P *officinalis*, r.
 Chamaedrys, r.
 Euphrasia *officinalis*, f.
 Bartsia *Odontites*, f.
 Pedicularis *sylvatica*, r.
 Nepeta *Glechoma*, c.
 Prunella *vulgaris*, c.
 H *Stachys* *palustris*
 H *arvensis*
 H *Lamium* *amplexicaule*
 H *purpureum*
 Teucrium *Scorodonia*, f.
 Plantago *major*, r.
 lanceolata, c.
 maritima, v.c.
 Coronopus, v.c.
 H *Chenopodium* *album*
 H *rubrum*
 Beta *maritima*, f.
 Atriplex *hastata*, c.
 Babingtonii, c.
 Polygonum *Hydropiper*, v.r.
 P *Persicaria*, v.r.
 Rumex *obtusifolius*, c.
 crispus, c.
 Acetosa, v.c.
 Acetosella, v.c.
 H *Euphorbia* *Helioscopia*
 H *Paralias*
 Urtica *dioica*, c.
 urens, r.
 P *Orchis* *incarnata*, v.r.
 Scilla *nutans*, v.c.
 Juncus *bufonius*, f.
 P *Gerardi*, v.r.
 conglomeratus, c.
 supinus, r.
 P *lamprocarpus*, r.
 P *acutiflorus*, f.
 P *Luzula* *campestris*, r.
 erecta, r.
 Lemna *minor*, r.
 Scirpus *Savii*, f.
 P *Carex* *arenaria*, c.
 P *vulpina*, r.
 H *echinata*
 ovalis, v.r.
 binervis, r.
 P *flava*, v.r.
 P *hirta*, v.r.

P	<i>Phalaris arundinacea</i> , v.r.	P	<i>Festuca sciuroides</i> , f.
	<i>Anthoxanthum odoratum</i> , c.		ovina, f.
	<i>Alopecurus geniculatus</i>	P	rubra, r.
	<i>Agrostis alba</i> , c.	P	<i>Bromus mollis</i> , r.
P	vulgaris, r.		<i>Lolium perenne</i> , r.
P	<i>Aira caryophylla</i> , f.		<i>Pteris Aquilina</i> , v.c.
P	praecox, c.	II	<i>Blechnum spicant</i>
	<i>Holcus lanatus</i> , c.	P	<i>Asplenium Adiantum-nigrum</i> ,
	<i>Arrhenatherum avenaceum</i> , r.		v.r.
P	<i>Cynosurus cristatus</i> , v.r.		marinum, f.
P	<i>Dactylis glomerata</i> , r.		<i>Athyrium Filix-foemina</i> , r.
	<i>Poa annua</i> , c.		<i>Lastrea Filix-mas</i> , r.
P	pratensis, f.		dilatata, r.
P	trivialis, r.		<i>Polypodium vulgare</i> , r.

In addition, a few stunted trees remain where they were planted near the house—Ash, Sycamore, Poplar, and Hawthorn ; and in the former garden, the Great Periwinkle, Daffodils, a tall Arum, and a large Allium still hold their own against forests of nettles.

As regards the question of change in flora consequent on the human abandonment of the island, interest centres on the plants found by Hart, but not seen by me, and *vice-versa*. Of the 60 species included in the latter category, I do not doubt that almost all of them are old inhabitants of the island. It must be remembered that Hart's visit was much more hurried than mine, and many plants must have been passed over. The only species which is clearly a new-comer is *Artemisia vulgaris*, of which a single plant was seen not much above spray-level, and below everything but maritime vegetation, in a rock-chink at the exposed southern point of the island—a clear case of a recent arrival, possibly brought from the adjoining mainland (where it is frequent) on a bird's foot or feathers, since the seeds are not fitted for wind-dispersal, and do not float in water.

The plants seen by Hart, but not by me, demand more consideration. I list them below in three groups, a query signifying that they are doubtfully referable to the group in which I have placed them.

A.—NATIVE SPECIES—I4.

Cardamine hirsuta.	Lonicera Periclymenum.
Polygala vulgaris.	Hieracium Pilosella.
? Viola tricolor.	Leontodon autumnalis.
? Geranium dissectum.	Jasione montana.
? Trifolium pratense.	Erythraea pulchella.
Vicia Cracca.	Carex echinata.
Lathyrus pratensis.	Blechnum Spicant.

B.—INTRODUCED WEEDS—I4.

Fumaria officinalis.	Veronica agrestis.
Raphanus Raphanistrum.	? Stachys palustris.
Spergula arvensis.	S. arvensis.
Anthemis Cotula.	Lamium purpureum.
Chrysanthemum segetum.	L. amplexicaule.
? Senecio vulgaris.	Chenopodium album.
Linaria Elatine.	Euphorbia Helioscopia.

C.—? ERRONEOUSLY RECORDED—2.

Chenopodium rubrum.	Euphorbia Paralias.
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Negative evidence is dangerous. Nevertheless, in consideration of the long and close scrutiny which I was able to give to the island, I have no doubt that many of these are now extinct, nor is there any cause for wonder in this. As regards Group A, the increase of both gulls and rabbits has so altered the vegetation that the only wonder is that so little change has to be recorded. Some of them may still exist in the close-cropped turf, but they will probably soon have entirely disappeared, since the rabbits do not let them seed.

Group B consists mostly of weeds of tilled land. Most of these are certainly extinct, the hard close-cropped turf which now covers the former tillage offering them no chance of life.

As regards Group C, I cannot but think there are mistakes here. *Chenopodium rubrum* is recorded as growing "indisputably native, in characteristic abundance . . . among the rabbit-holes and rocky ground at the barren

south-eastern corner of the island." No trace of the plant could be found, but a laciniate-leaved *Atriplex* was abundant in the situations indicated. As regards *E. Paralias*, there is no suitable habitat on the island, and I fear some confusion with stations on the mainland, where it is abundant; or perhaps *Paralias* is a slip for *Peplus*.

Turning to the difficult question of the standing of the plants composing the flora of the Great Saltee, we have first a small group of species deliberately introduced. These include, in addition to the trees and garden plants referred to on p. 187, four naturalized species, namely:—

Brassica Rapa.

Symphytum officinale.

Ulex europaeus.

Sambucus nigra.

Of these, the Rape is abundant on old earth fences with thistles and nettles, and seems destined to remain; the Comfrey has settled down near the house; the two bushes have spread, though to no great extent, from their original position in fences.

Next comes a large group of species which are probably not indigenous to the island. Most of them have presumably come with farm seeds; others possibly on the feet of cattle or men, or with the various materials imported by man. A few of them appear to be already extinct, as listed above; others are now on the verge of extinction. I list these below, bracketing those not seen by me, adding a query to species which may after all be indigenous, and adding to each its relative abundance:—

Ranunculus parviflorus, v.r.

Conium maculatum, r.

Fumaria confusa, v.r.

Sherardia arvensis, v.r.

(*F. officinalis*).

(*Anthemis Cotula*).

Sinapis arvensis, v.r.

(*Chrysanthemum segetum*).

(*Raphanus Raphanistrum*).

Tussilago Farfara, r.

Stellaria media, c.

(*Senecio vulgaris*).

(*Spergula arvensis*).

Arctium minus, r.

Alchemilla arvensis,

Carduus pycnocephalus,

v.r.

v.r.

<i>Carduus arvensis</i> , c.	(<i>Lamium purpureum</i>).
<i>Lapsana communis</i> , v.r.	(<i>L. amplexicaule</i>).
<i>Sonchus arvensis</i> , r.	<i>Plantago major</i> , r.
<i>Anagallis arvensis</i> , f.	(<i>Chenopodium album</i>).
(<i>Linaria Elatine</i>).	<i>Polygonum Persicaria</i> , v.r.
<i>Veronica hederaefolia</i> , v.r.	(<i>Euphorbia Helioscopia</i>).
(<i>V. agrestis</i>).	<i>Urtica dioica</i> , c.
<i>V. Tournefortii</i> , v.r.	<i>U. urens</i> , r.
<i>V. arvensis</i> , r.	<i>Lemna minor</i> , r.
(<i>Stachys palustris</i>).	<i>Bromus mollis</i> , r.
(<i>S. arvensis</i>).	<i>Lolium perenne</i> , r.

It will be seen that out of 38 species, only four—*Stellaria media*, *Carduus arvensis*, *Anagallis arvensis*, and *Urtica dioica*, occur otherwise than sparingly; clearly the introduced flora is in a bad way.

These 38 species, plus the four already mentioned as planted and naturalized, give a total of 42 species to be deducted from the total list if we wish to obtain the present indigenous flora of the Great Saltee. That total is thus 155, less an indefinite number of the species in list "A," on page 188, the 14 native or probably native plants recorded by Hart, but not seen by me, some of which I believe to be extinct. If we assume half of them to be now extinct, we have an indigenous flora of 148, or a total flora (excluding the planted trees and garden plants on p. 187) of 190 species.

I close with a few notes on individual species, with reference to points not brought out in the preceding pages.

Ranunculus parviflorus, L.—Fine specimens gathered by R. M. Barrington are in the National Herbarium. Mr. Barrington and I refound it, growing very small, in close turf in several spots by the sea below the house.

R. Ficaria, L.—Still flowering in mid-June, even on open southern slopes, with *Hydrocotyle vulgaris* and *Carex arenaria*.

Erodium cicutarium, L'Hérit.—One colony on the beach at "The Ring," all with white flowers.

Rubus.—Two Brambles occur on the island, both in several places. Rev. E. F. Linton has kindly identified them for me as *R. leucostachys*, Schleich, and *R. nemoralis*, P. J. Muell.

Aretium and **Atriplex.**—One Burdock and two Oraches occur, but were much too immature for determination. I have no reason for not accepting Hart's names.

Orehis incarnata, L.—The only orchid on the island. Canon Lett found one specimen close to the house on its west side, and Dr. Lindner another on the south-east.

Scilla nutans, L.—Exceedingly abundant and luxuriant. On one stem I counted 49 blossoms.

Lemna minor, L.—Occurred in one artificial pool, but also twice in a quite different habitat—on the S.W. side, where springs emerge from the rocks half way down the cliffs. Here the plant grew in dense tufts on wet vertical or sloping rocks. Possibly brought by birds from its other station, but quite established, and looking native in these curious situations.

Asplenium Adiantum-nigrum, L.—Seen only in an artificial habitat—the stone-faced dyke by the “road” leading from the house towards the cliffs; but probably from wind-borne spores.

I have pursued the subject of the present paper at greater length than the flora of a small island might seem to warrant; but in the Great Saltee we have a very interesting case of change of flora due to the withdrawal of man and consequent changes of fauna. How far these changes have now ceased, and the flora restored to a state of equilibrium, is not easy to say. The vegetation of the untilled land and the bird-colonies is possibly stable, so long as the present fauna remains stable; but I think it probable that the vegetation of the ground formerly occupied by tillage is still developing and has not yet reached stability. *Potentilla Anserina*, *Carex arenaria*, *Sagina procumbens* and the other abundant plants have still to fight it out among themselves, and possibly all will eventually be ousted by grasses. When twenty years hence some other botanist studies the flora of the island, I hope these notes will help him to furnish a further study of the development of the flora.

II. MOSSES AND HEPATICS.

BY REV. CANON H. W. LETT, M.A.

The Muscineae collected in June, 1913, on the Great Saltee Island number 74 Mosses and 20 Hepatics, all of which are common. Unlike the habit of these plants in most parts of Ireland, I noticed that on this island they were all very scarce, and the colonies or tufts were invariably very small. This peculiarity I attribute to the presence of the multitudes of sea-birds and Rabbits which hold possession of the island. The Herring Gulls occupy every outcrop of rock or stone, their nests or hatching spots being everywhere in the large area covered by the forests of *Pteris Aquilina*, and they prevent any mosses growing except in odd crevices and corners, their excrement and the constant trampling of their webbed feet being inimical to the existence or spread of cryptogams. The Rabbits also, by their burrowing in the earthen portions of the fences of what were some years ago cultivated fields, do not permit Mosses or Hepatics to fix themselves in what in other localities are favourite habitats of these plants. The dry-built stone walls which form a portion of these dividers of the land are kept free of Mosses by the birds which use them as look-out stations and resting places while they are devouring such Rabbits as they may capture ; the relics of such feasts are noticeable in the quantities of fur and bones left along the tops of these wall-fences.

At the south-west end of the island there is a large wide space close to the rocky margin of the sea where the Puffins do not allow a rush-spear or blade of grass to exist, the earth, which is black, being quite bare of vegetation, and there are several similar bare spots in other places on the island ; of course, not a scrap of a Moss or Hepatic grows in such deserts. On the other hand, all round the margin, especially on the north-west side, there are spots few and far between where the banks of clay and rocks are either almost perpendicular or where they overhang, and there the birds and beasts cannot rest or nest ; these were the

only places on the island where I found Mosses and Hepatics having a look of undisturbed nature about them.

With a shore on which there is no sandy or even pebbly strand, and where there are great rocks and accumulations of large boulders out of the reach of the tide, there are many places where the muscologist would expect to find *Grimmias* flourishing, but there are none, except one little tuft of *Grimmia apocarpa*. The only species of *Orthotrichum* that I found was *O. diaphanum*, of which there is a small colony growing on one of the stunted trees in what was the garden in front of the dwelling-house.

The unusual smallness of the few cushions of *Campylopus* and *Dicranum*, which become perfectly dry when there has been no rain, accounts for the absence of several Hepatics that elsewhere abound in such companionship.

Only one colony of *Sphagnum* was met with (by Mr. Praeger), it is near the west end of the island, where two species are comparatively abundant over a few square yards, these were the only patches of moss of any size that I saw.

My notes and specimens show that the Mosses and Hepatics of most frequent occurrence were in this order :

MOSESSES.

1. *Hypnum praelongum*.
2. *Barbula fallax*.
3. *Hypnum rutabulum*.
4. *Mnium hornum*.
5. *Stereodon resupinatus*.
6. *Dicranum scoparium*.

HEPATICS.

1. *Lophocolea bidentata*.
2. *Frullania tamarisci*.
3. *F. dilatata*.
4. *Scapania undulata*.
5. *Lepidozia reptans*.
6. *Anthoceros punctatus*.

LIST OF SPECIES.

MOSESSES.

[As in Braithwaite's "British Moss-Flora."]

Polytrichum aloides.
 sexangulare.
 piliferum.
 juniperinum.
Fissidens viridulus.
 bryoides.

Ditrichum flexicaule.
 tortile.
Dicranella curvata.
 heteromalla.
Anisothecium rubrum.
 var. tenellum.

- | | |
|----------------------------|---------------------------|
| Campylopus pyriformis. | Bryum erythrocarpum. |
| fragilis. | Mnium hornum. |
| flexuosus. | Thuidium tamariscifolium. |
| var. paradoxus. | Amblystegium serpens. |
| Dicranum scoparium. | riparium. |
| var. alpestre. | chrysophyllum. |
| Ceratodon purpureum. | polygamum. |
| Tortula muralis. | falcatum. |
| montana. | fluitans. |
| cylindrica var. vinealis. | kneiffii. |
| Mollia viridula. | Hypnum purum. |
| * crispula. | cæspitosum. |
| litoralis. | murale. |
| brachydontia. | velutinum. |
| flavovirens. | pallidirostre. |
| inclinata. | praelongum. |
| fragilis. | curvisetum. |
| Barbula rubella. | confertum. |
| fallax. | viride. |
| cylindrica. | rutabulum. |
| revoluta. | sericeum. |
| convoluta. | lutescens. |
| unguiculata. | Isothecium myosuroides. |
| Grimmia apocarpa. | Hylocomium parietinum. |
| Glyphomitrium polyphyllum. | squarrosum. |
| Orthotrichum diaphanum. | Stereodon cupressiforme. |
| Bryum intermedium. | var. elatus. |
| cæspiticium. | resupinatum. |
| murale. | Acrocladium cuspidatum. |
| capillare. | Sphagnum cymbifolium. |
| pendulum. | acutifolium. |

HEPATICS.

[As in Macvicar's " Handbook of British Hepatics."]

- | | |
|-----------------------|-------------------------|
| Anthoceros punctatus. | Lophocolea bidentata. |
| Metzgeria furcata. | Lophozia alpestris. |
| Aneura multifida. | bicrenata. |
| sinuata. | barbata. |
| incurvata. | porphyroleuca. |
| Pellia epiphylla. | ventricosa. |
| Frullánia tamarisci. | Aplozia crenulata. |
| dilatata. | Saccogyna viticulosa. |
| Scapania undulata. | Calypogeia trichomanis. |
| Lepidozia reptans. | Cephalozia leucantha. |

Loughbrickland, Co. Down.

III. MARINE ALGAE.

BY A. D. COTTON.

The collection of marine algae made by Mr. Praeger on the Saltees, supplies a substantial addition to our knowledge of the marine flora of S.E. Ireland. According to the scheme devised by Adams, the islands come under the sub-province of LI of Leinster, and the list for that region was poorer than for any other sub-division of Leinster or Munster (see *I.N.*, vol. xx., 1911, p. 87). The total number of species hitherto listed was 63 (Cyanophyceae 2, Chlorophyceae 11, Phaeophyceae 18, Florideae 32). The total number collected by Mr. Praeger is 120, the groups being represented as under :—Blue Green 1, Green 17, Brown 39, Red 63. The collection, as a whole, was such as one would expect from the south of Ireland, though the fact that some of the more important and interesting of the Irish species are not represented is significant, and emphasizes the need of further work.

With regard to the nature of the shore and the vegetation covering it, Mr. Praeger writes :—"Most of the collecting was done in a limited area at either end of the island, where, at the junction of the cliffs of the southern side with the beach of large angular boulders of the northern side, there are a number of gulleys and rock-pools. The 'Reds' were mostly obtained at the landing place half-way along the north side, where drifted material had collected. Exposure is rather great on the cliff-bound southern face, much less on the north side. At the two ends, where collecting was done, *Alaria* and *Ascophyllum* overlap in about equal quantity. On the boulder-beach *Fuci* cover the whole shore, with plenty of *Ascophyllum*. *Alaria* is dominant under the cliffs of the south side."

A fairly large proportion of the collection consisted of species requiring sheltered conditions. These had probably drifted from the neighbouring *Zostera* beds on the mainland. Several notably "exposed" species such as *Nemalion*, *Cladophora uncialis* and the northern *Callithamnion*

arbuscula or southern *C. granulatum* were not represented, but this may be perhaps due to the more exposed spots being less accessible. The presence of *Alaria* and *Ascophyllum* together is particularly interesting. As a rule, *Alaria* (except for odd plants in pools) occurs on exposed and rather steep shores, whereas *Ascophyllum* requires shelter and prefers sloping rocks or boulders. Presumably the peculiar physical nature of the shore at the ends of the island provides in a combined form the conditions essential for each species, namely, the ruffled well-aerated water required by *Alaria* and the protection from breakers necessary for *Ascophyllum*.

Amongst interesting species, attention may be drawn to *Prasiola crispa*, *Chantransia Chylocladiae*, and *Pterosiphonia parasitica*, notes on which will be found in the list. As to absentees, although a special look-out was kept for *Codium mucronatum* var. *atlanticum*, *Callithamnion granulatum*, *C. arbuscula*, and *Ptilota plumosa*, none of these species were found. The last two boreal plants are supposed to occur in the south of Ireland; I have, however, seen no specimens, and it is highly desirable to have the records confirmed. *Halopithys pinastroides*, which is only known in Ireland from Leinster, was also not collected.

In addition to dried specimens, a packet of fresh weeds which had been soaked in 10 per cent. formalin was forwarded. These remained in excellent condition for several days, and illustrated the value of this method of sending fresh material through the post.

The following is a complete list of species collected:—

LIST OF SPECIES.

CYANOPHYCEAE.

Hyella caespitosa Born. In *Spirorbis* in *Phyllophora rubens*.

CHLOROPHYCEAE.

<p><i>Prasiola crispa</i> Menegh.—“Common on the rocks at the S.W. end amongst the bird colonies. I did not see it lower than about</p>	<p>50 feet, nor higher, I think, than 150 feet.” [R. L. P.]. Remarkably fine specimens, and much larger than anything</p>
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- found on Clare Island or The Enteromorpha
 Bills. This alga is capable of intestinalis *Link.*
 absorbing large quantities of Ulva Latuca *L.*
 ammonia, and occasionally Endoderma Wittrockii *Wille.* In
 occurs on the filter beds in *Ectocarpus fasciculatus.*
 sewage farms, where it attains Chaetomorpha aerea *Kütz.*
 an equally large size. Under Cladophora Hutchinsiae *Harv.*
 these conditions, however, it is rupestris *Kütz.*
 supplied with abundant mois- sericea *Kütz.*
 ture, growing at times directly albida *Kütz.*
 under the sprinklers. The var. refracta *Kütz.*
 Saltees material showed every arcta *Kütz.*
 transition from the filamentous lanosa *Kütz.*
 form to the broad leafy thallus. Ostreobium Quekettii *Born. et Flah.*
 Enteromorpha clathrata *J. Ag.* —In Spirorbis on Phyllo-
 compressa *Grev.* phora rubens.
 Linza *J. Ag.* Codium tomentosum *Stackh.*

PHOEOPHYCEAE.

- Desmarestia viridis *Lamour.* Microspongium globosum *Reinke.*—
 aculeata *Lamour.* Second record for Ireland.
 ligulata *Lamour.* Chordaria flagelliformis *Ag.*
 Dictyosiphon foeniculaceus *Grev.* Leathesia tuberiformis *Aresch.*
 Litosiphon pusillum *Harv.* Laminaria saccharina *Lamour.*
 Laminariae *Harv.* digitata *Lamour.*
 Philoospora brachiata *Born.* Cloustoni *Edm.*
 Scytosiphon lomentarius *J. Ag.* Alaria esculenta *Grev.*
 Asperococcus fistulosus *Hook.* Fucus spiralis *L.*
 Ectocarpus simplex *Crn.*—In Codium vesiculosus *L.*
 tomentosum. serratus *L.*
 siliculosus *Kütz.* Ascophyllum nodosum *Le Jol.*—The
 fasciculatus *Harv.* marine fungus *Mycosphaerella*
 tomentosus *Lyngb.* *Ascophylli*, Cotton, was present
 granulosus *Ag.* in all the receptacles of *Asco-*
 Pylaiella litoralis *Kjellm.* phyllum forwarded. It doubt-
 Isthmoplea sphaerophora *Kjellm.* less occurs around the whole
 Myriotrichia clavaeformis *Harv.* Irish coast, but has only been
 Elachista fucicola *Fries.* recorded from the Clare Island
 Sphacelaria cirrhosa *Ag.* district.
 Cladostephus spongiosus *Ag.* Pelvetia canaliculata *Decne. et Thur.*
 verticillatus *Ag.* Himanthalia lorea *Lyngb.*
 Myrionema strangulans *Grev.* Halidrys siliquosa *Lyngb.*
 Hecatonema reptans *Kylin.*— Cystoseira granulata *Ag.*
 Second record for Ireland. Dicytota dichotoma *Lamour.*

FLORIDEAE.

- Conchocelis rosea *Batt.*—In Spir- Porphyra umbilicalis *Kütz.*
 orbis on Phyllophora rubens.

Chantransia virgatula Thur.

Chylocladia (Batt.) Adams.—The second record for Ireland. The plant, which was added to the Irish list during the Lambay survey, was not found on Clare Island, though repeatedly searched for.

Choreocolax polysiphoniae Reinsch.

Gelidium corneum Lamour.

Chondrus crispus Stackh.

Gigartina mamillosa J. Ag.

Phyllophora rubens Grev.

Ahnfeltia plicata Fr.

Sterrocolax decipiens Schm.

Callophyllis laciniata Kütz.

Callocolax neglectus Schm.

Cystoclonium purpurascens Kütz.

Calliblepharbis jubata Kütz.

Rhodymenia palmata Grev.

Lomentaria articulata J. Ag.

clavellosa Gaill.

Chylocladia kaliformis Hook.

ovalis Hook.

Plocamium coccineum Lyngb.

Nitophyllum punctatum Grev.

laceratum Grev.

Delesseria sinuosa Lamour.

sanguinea Lamour.

alata Lamour.

ruscifolia Lamour.

hypoglossum Lamour.

Rhodomela subfusca Ag.

Laurencia obtusa Lamour.

hybrida Lenorm.

Polysiphonia urceolata Grev.

violacea Grev.

fastigiata Grev.

atro-rubescens Grev.

Brodiaei Grev.

Pterosiphonia parasitica Schm.—A single specimen, apparently representing a remarkably robust form of this species, was for-

warded. The plant was fully as stout as *P. pennata* (which is known as far north as Normandy) but differed in habit, the outline of the fronds resembling more closely those of *P. parasitica*. In microscopic structure it agrees well with that species. I submitted the specimen to Mr. E. M. Holmes, who agrees that unless further distinctions are forthcoming one cannot do otherwise than regard it as an exceptionally strong form of *P. parasitica*.

thuyoides Schmitz.

Brongniartella byssoides Bory.

Heterosiphonia coccinea Falk.

Spermothamnion Turneri Aresch.

Griffithsia setacea Ag.

Monospora pedicellata Sol.

Rhodochorton Rothii Naeg.

Callithamnion Hookeri Ag.

tetragonum Ag.

Plumaria elegans Schm.

Ceramium strictum Harv.

diaphanum Roth.

Boergesenii Petersen.

rubrum Ag.

ciliatum Duchuz.

Gloiosiphonia capillaris Carm.—

Rather rare on Clare Island, and only noted during July, 1909.

Dumontia filiformis Grev.

Dilsea edulis Stackh.

Furcellaria fastigiata Lamour.

Hildenbrandtia prototypus Nardo.

Lithophyllum pustulatum Fosl.

incrustans Phil.

lichenoides Ellis.

Epilithon membranaceum Heydr.

Corallina officinalis L.

squamata Ellis.

rubens Ellis et Sond.

Royal Gardens. Kew.

IV. LICHENS.

BY M. C. KNOWLES.

The Lichens of the district LI of Mr. Adams' subdivisions of Ireland (which consists of the counties of Wexford, Carlow and Kilkenny), have received very little attention, only 31 species having been recorded from this area. It was a great satisfaction, therefore, to go through the material collected by Canon Lett and Mr. Praeger on the Saltee Islands, and to find that the majority of the species were additions to the district.

Altogether the material yielded 86 species, 5 sub-species, 7 varieties and 5 forms; of these, 75 species and all the sub-species, varieties and forms are new to LI.

In the list which follows, all but the undermentioned are new to Adams' province LI :—

<i>Lichina pygmaea</i> .	<i>Physcia stellaris</i> .
<i>Sphaerophorus coralloides</i> .	<i>Lecanora parella</i> .
<i>Cladonia pyxidata</i> .	<i>Lecidea parasema</i> .
<i>Cladina sylvatica</i> .	<i>Buellia stellulata</i> .
<i>Ramalina farinacea</i> .	<i>Acrocordia biformis</i> .
<i>Physcia parietina</i> .	

LIST OF SPECIES.

P=Praeger ; L=Lett. Where there is no letter it means that the species was collected by both.)

P. <i>Lichina pygmaea Ag.</i>	L. <i>Ramalina subfarinacea.</i>
P. <i>confinis Ag.</i>	P. <i>cuspidata Nyl.</i>
L. <i>Sphaerophorus coralloides Pers.</i>	L. <i>Curnowii Cromb.</i>
P. <i>Stereocaulon coralloides Fr.</i>	P. <i>Usnea florida Ach.</i>
<i>Cladonia pyxidata Fr.</i>	L. <i>hirta Hoffm.</i>
<i>cervicornis Schaer.</i>	<i>Parmelia perlata Ach.</i>
L. <i>sobolifera Nyl.</i>	P. <i>subsp. ciliata Nyl.</i>
<i>furcata Hoffm.</i>	L. <i>laevigata Ach.</i>
<i>pungens Flörke.</i>	<i>saxatilis Ach.</i>
<i>Cladina sylvatica Nyl.</i>	<i>f. furfuracea Schaer.</i>
P. <i>Ramalina farinacea Ach.</i>	L. <i>sulcata Tayl.</i>
<i>pollinaria Ach.</i>	<i>caperata Ach.</i>
<i>scopulorum.</i>	L. <i>exasperata Ach.</i>

- P. *Parmelia omphalodes* Ach.
 fuliginosa Nyl.
 L. *Peltigera rufescens* Hoffm.
 P. *polydactyla* Hoffm.
 Physcia flavicans DC.
 parietina De Not.
 L. *var. aureola* Nyl.
 P. *var. aureola* Nyl. f. con-
 gratulata Cromb.
 aquilla Nyl.
 P. *stellaris* Nyl.
 P. *subsp. tenella* Nyl.
 P. *Lecanora murorum* Ach.
 L. *subsp. decipiens* Nyl.
 P. *lobulata* Somm.
 L. *vitellina* Ach.
 P. *citrina* Ach. f. *depauperata*
 Cromb.
 ferruginea Nyl. *var. festiva*
 Nyl.
 P. *caesiorufa* Nyl.
 L. *Turneriana* Nyl.
 P. *sophodes* Ach.
 P. *subsp. lævigata* Nyl.
 L. *exigua* Nyl.
 P. *subexigua* Nyl.
 L. *atrocinerea* Nyl.
 subfusca Nyl.
 campestris.
 P. *rugosa* Nyl.
 P. *atrynea* Nyl.
 coilocarpa Nyl.
 gangalioides Nyl.
 P. *albella* Ach.
 prosechoides Nyl.
 atra Ach.
 parella Ach.
 P. *pallescens* Nyl.
 L. *cinerea* Somm.
- Lecanora fuscata* Nyl.
 smaragdula Nyl.
Lecidea granulosa Schaer.
 protrusa Fr.
 P. *parasema* Ach.
 elaeochroma Ach.
 L. *latypea* Ach.
 P. *panaeola* Ach.
 L. *auriculata* Th. Fr.
 L. *Biatorina synothea* Koerb. *subsp.*
 nigrata A. L. Sm.
 P. *chalybeia* Mudd.
 Bacidia umbrina Branth et Rostr.
Buellia canescens De Not.
 L. *spuria* Koerb.
 L. *myriocarpa* Mudd.
 L. *verruculosa* Mudd.
 stellulata Mudd.
 L. *colludens* Tuckerm.
 P. *confervoides* Krempf.
 P. *Rhizocarpon alboatrum* Th. Fr.
 P. *var. venustum* A. L. Sm.
 P. *geographicum* DC.
 confervoides DC.
 P. *Arthonia radiata* Ach.
 P. *varians* Nyl.
Opegrapha atra Pers.
 L. *f. parallela* Leight.
 calcareæ Turn.
 f. heteromorpha.
 vulgata Ach.
Enterographa crassa Fe.
 P. *Verrucaria maura* Wahlenb.
 P. *var. memnonia* Koerb.
 P. *scotina* Wedd.
 nigrescens Pers.
 L. *Acrocordia biformis* Oliv.
 P. *var. conformis* A. L. Sm.
Porina chlorotica Wainio.

NOTES.

Ramalina pollinaria, Ach.—Abundant, but infertile; now recorded from the east coast of Ireland for the first time.

Usnea hirta, Hoffm.—The thallus of some of the specimens of this species was covered with cephalodia.

Physcia flavicans, DC.—Very common, forming large orange-yellow patches on the stems and twigs of heather, associated with *Ramalina farinacea*, *Parmelia perlata* and *P. caperata*.

Lecanora murorum, Ach., subsp. *decipiens*, Nyl.—The specimens seen of this sub-species were mainly barren growths similar to those found at Howth. This is the second Irish record for the sub-species.

L. caesiorufa and *L. Turneriana*, Nyl.—Rare; the only previous record for these two species from the east coast is Howth.

L. subexigua, Nyl.—Frequent; the second record for Ireland.

L. prosechoides, Nyl.—Frequent. This species was associated with *Verrucaria maura*, *V. scotina*, *Rhizocarpon alboatrum*, and *Lecanora lobulata*, and evidently occupied the same place on the shore, among the semi-marine lichens, that it does on the Howth coasts. It was also interesting, as on the Howth coasts, to find that it was the host of *Arthonia varians*. The usual host of this parasitic lichen is, according to the "Monograph of British Lichens," *Lecanora glaucoma*, and it only rarely occurs on *L. prosechoides*. On the Howth coasts *A. varians* was extremely abundant on *L. prosechoides*, and it is also plentiful on the specimens examined from the Saltee Islands.

Lecidea latypea, Ach.—Rare; the only previous Irish record for this species is Clare Island.

L. auriculata, Th. Fr.—Rare; the only previous Irish record is Achill.

Biatorina synothea, Koerb.,
subsp. *nigrata*, A. L. Sm.

B. chalybeia, Mudd.

Bacidia umbrina, Branth. and
Rostr.

Buellia spuria, Koerb.

B. verruculosa, Mudd.

B. colludens, Tuckerm.

B. confervoides, Krempf.

These seven species have
been recorded only
from one other locality
on the east coast, viz.
Howth.

Verrucaria scotina, Wedd.—Rare; the second Irish record.

Porina chlorotica, Wainio.—This species was very abundant on rather smooth shady rock-surfaces, and was associated with *Lecidea protrusa*, *Rhizocarpon confervoides* and *Lecanora atra*. It grows in similar situations at Howth which is the only other locality on the east coast from which it has been recorded.

National Museum, Dublin.

NOTES.

BOTANY.

Forgers of Nature's Signature.

Under the title of "An Excellent Suggestion," a letter appears in the *Northern Whig* of September 6, advocating the scattering of the seeds of garden plants in bare spots in the country. We have on more than one occasion pointed out the grave wrong wrought by any thoughtless introducer of either plants or animals, and the confusion to which this practice tends to lead in the records of both zoology and botany. We are glad to note that in the present instance the suggestion—made possibly in ignorance of the results of such action—was promptly met by vigorous protests from two of our most active and useful northern naturalists—N. H. Foster and A. W. Stelfox.

ZOOLOGY.

Two Beetles from Co. Louth.

On July 24th, Mrs. Johnson and I made an expedition to Carlingford in search of insects. These proved to be decidedly scarce. However, by turning stones on the shore I obtained specimens of two beetles which have not hitherto been recorded from Co. Louth. These are *Cillenus lateralis* Sam, and *Micralymma brevipennis* Gyll.; both species occurred between tide marks. *Cillenus* was quite scarce (I only got four), and I believe it was only emerging as I saw several larva which I strongly suspect were those of this beetle. *Micralymma*, on the other hand was pretty plentiful, and I could have got a large series if I had wished.

W. F. JOHNSON.

Poyntzpass.

Longicorn at Poyntzpass.

A fine specimen of *Rhagium bifasciatum* Fab., was given me on June 23rd by Miss M. T. Alexander, who had found it sitting on the window sill of the library in Acton House. This is the second record of a longicorn from County Armagh, the other being my own of *Pogonochaerus bidentatus* Thorus, at Loughgall. There are plenty of fir trees about here, but the remarkable thing is that so conspicuous a beetle should have escaped notice.

W. F. JOHNSON.

Poyntzpass.

Notes on Irish Myriapoda—A Correction.

I regret to say that the record in my paper (*ante*, p. 130), of *Julus scandinavicus*, Latzel, as new to Ireland, was an error. *I. scandinavicus* is synonymous with *I. lugulifer*, Latzel-Verhoeff, and I had already recorded it under the latter name in the Clare Island Survey reports.

W. F. JOHNSON.

Poyntzpass.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a pair of American Bison from the Canadian Government, a pair of four-horned Sheep from Lady Constance Butler, a pair of Rabbits from Mr. W. E. Anderson, a Black and White Lemur from Mrs. Dunville, a Capuchin Monkey from Mr. T. C. Dickie, two Touracous from Miss Waterhouse, a Blue-fronted Amazon from Miss F. Lewis, a ring-necked Parrakeet from Miss Irvine, and a Slow-worm from Mr. H. S. Mostyn. Three Puma cubs have been born in the gardens. It is very many years since Bison have been on view in the Dublin collection. The splendid pair of animals generously given by the Dominion Government come from the great park at Banff, where a large herd is protected under natural conditions.

BELFAST NATURALISTS' FIELD CLUB.

JULY 12.—EXCURSION TO DUBLIN.—Travelling to Dublin by the 7.30 train, the party first went to Glasnevin Gardens, where they were received by Sir F. W. Moore and Mr. C. F. Ball, and conducted through the extensive grounds and houses. Proceeding to the Zoological Gardens, they lunched there, and were then conducted round the collections by Prof. G. H. Carpenter and Dr. B. B. Ferrar. The 6.0 train conveyed the party back to Belfast.

REVIEWS.

THE STUDY OF ROCKS.

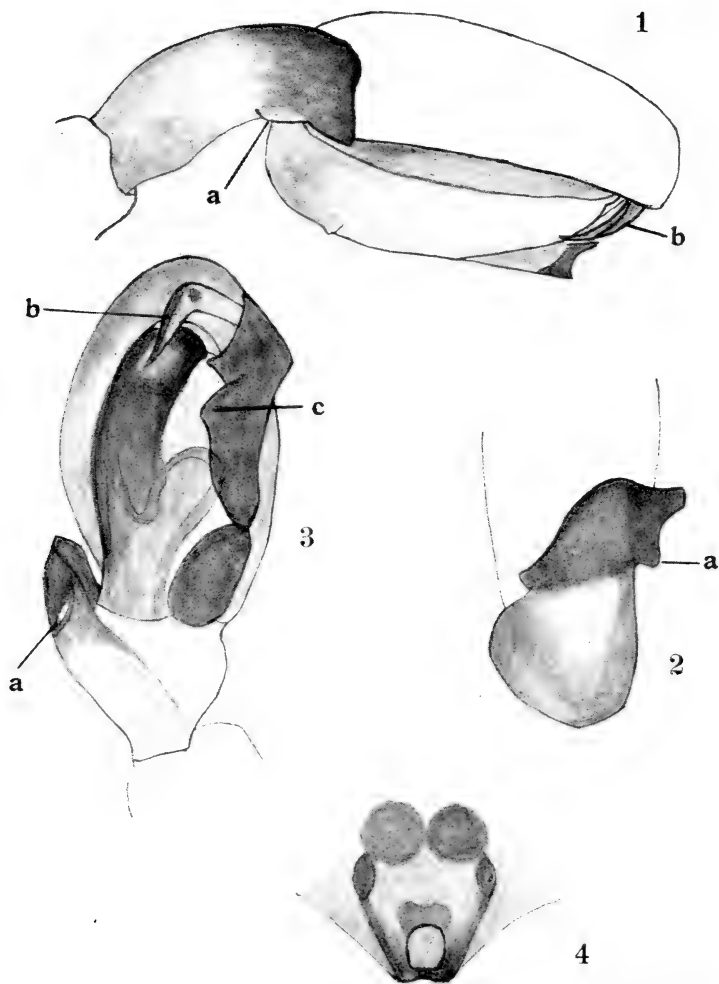
A Manual of Petrology. By F. P. MENNELL, F.G.S. London: Chapman and Hall, 1913. Pp. viii + 256. Price 7s. 6d.

This clearly written and well printed work is an enlargement of the author's "Introduction to Petrology," published in 1909. Like its predecessor, it introduces the student to a wider area of observation than is usual in such text-books, since the author's experience has been largely gathered in the open-air study of rocks in southern Africa. That its outlook is by no means restricted will be seen by his description and illustration of the rhyolites of the county of Antrim on p. 133, and of the altered chalk of Scawt Hill on p. 202.

The introductory chapters on rock-forming minerals are of necessity slight, but form an important adjunct for those who have to limit their libraries when travelling, or in the prospector's camp. The serious student will want to know a little more of the relations of the optical phenomena that are utilised in thin slices under the microscope to the forms of minerals studied. On p. 16 it is implied that an ordinary ray arises in all cases of double refraction; and on p. 15 the danger of relying on mean refractive indices is not pointed out. In the descriptions of such important minerals as quartz, tourmaline, and calcite, we should like to find some reference to their different types of trigonal symmetry. The statement that the two former are hexagonal, and that calcite is rhombohedral is surely somewhat out of date. As usually happens in petrographic works, the microscopic characters of minerals are relied on almost exclusively. Even in the case of muscovite (p. 52), the mention of straight extinction shows that the forms seen in thin sections are being considered, and not those so easily recognised in the field. Tourmaline (p. 70) is stated to be transparent; but few geologists will note this character when hammering at common crystals of schorl. In this treatment, Mr. Mennell has followed what is customary, rather than his own good advice given later on p. 82.

It is not of much avail to quarrel with the names for rocks that have received acceptance through the profound authority of Rosenbusch, but a "glassy granophyre" (p. 131), instead of a "vitrophyre," seems an undue defiance of Vogelsang, the inventor of the term. To pass from such details, there is much that is unconventional in the author's discussion of types of rocks. We welcome his treatment of assimilation by igneous masses, of the origin of the much discussed banded ironstones (p. 192), and especially of contact-metamorphism on a regional scale (p. 204). The book concludes with a good review of the geological aspects of radioactivity

G. A. J. C.



CLUBIONA JUVENIS SIMON.

CLUBIONA JUVENIS SIMON.

A SPIDER NEW TO THE BRITISH ISLES RECENTLY FOUND
IN IRELAND.

BY A. RANDELL JACKSON, M.D., D.SC.

AND DENIS R. PACK-BERESFORD, B.A., M.R.I.A.

In June, 1911, Mr Reynell Pack-Beresford collected a few spiders on the sandhills at Arklow, Co. Wicklow, amongst which we found three females belonging to the genus *Clubiona*, but of which the species was unknown to us. On submitting these specimens to Professor Kulczynski, of Cracow, he said that they were also unknown to him, but suggested that they might possibly be *Clubiona juvenis* Simon. In order to clear up this point it was necessary to try to get some adult males, and accordingly a further expedition to Arklow, in which Mr. R. Pack-Beresford joined, was made this year on June 22nd with this object in view. After working for about an hour and a half amongst the sand-hills along the sea-shore, three males and some five or six females were captured, besides many immature specimens of various ages. They live in the densest parts of the tufts of grass on the sandhills, and run rapidly over the sand when disturbed. A few specimens of *Clubiona neglecta* Camb. were also taken at the same time and place.

A comparison of these three males with M. Simon's description and Dr. de Lessert's figures made it quite clear that Professor Kulczynski's surmise was correct, and that the spiders were referable to the species described by M. Simon as *Clubiona juvenis*. With this conclusion the Rev. O. P. Cambridge, who has examined a pair of the specimens, agrees. Our collecting was brought to an abrupt ending by the arrival on the scene of an employé of Messrs. Kynoch, who told us that we were on ground strictly forbidden to the public, as we were amongst the huts in which explosives are stored. Unfortunately the manager of the works could not be found on the moment, and the time at our disposal did not admit of a search being made for him, otherwise we should no doubt have been able to get permission to continue our investigations; as it was, we had to be content with the results already attained.

Clubiona juvenis is described by M. Simon in "Les Arachnides de France," vol. iv., pp. 227 and 228. No figures are given. Dr. R. de Lessert, however, figures the sexual organs of both sexes in his "Catalogue des Invertébrés de la Suisse," fasc. 3, Araignées, pp. 411 and 412. Nevertheless we think a few additional remarks may help British students to recognise this species when found.

Length.—Two males measured respectively 3·7 mm. and 4·6 mm., whilst two females measured 5·6 mm., and 5·7 mm.

Form.—Both sexes are of a slender rather linear build.

Colour.—In living specimens this appears very pale, some examples being almost white with dark heads. Carapace yellow-brown with a short longitudinal line at the thoracic juncture, and some dark pigment in the ocular area. Sternum yellow-brown. Legs and female palpi pale yellow-brown. Falces, maxillae, and labium usually deep red-brown, the first being the most deeply pigmented. Abdomen usually yellow-brown, in one case however it was of a warmer shade approaching red-brown.

Spines.—M. Simon divides the genus *Clubiona* for the purposes of identification into two sections, viz., those in which the third tibiae bear each two spines beneath, and those in which only one spine is present in this situation.

No doubt this is a variable feature, but all the British *Clubionae* we have hitherto seen have been quite regular in this respect. This is not however the case with *C. juvenis*. Six specimens were examined and of these two spines were present in two cases, one spine in two cases, and in the remaining two, one spine was present on one side, and two on the other. This character thus breaks down in the present species.

Male palpus.—Femur and patella pale yellow-brown like the legs. The tibia bears a long broad apophysis of a deep red-brown colour. This terminates on the outer side in two branches. Of these the anterior or superior is large, strong, and obliquely truncated at the extremity. The posterior or inferior branch (Plate I, figs. 1, 3, a,) is very small, and projects almost at right angles to the body of the apophysis. It is almost invisible in an external elevation but seen from above appears to look downwards and back-

wards. It seems almost absurd to describe it as a *branch* of the apophysis, but it appears to represent the similarly placed, but much better developed and differently shaped inferior branch seen in such species as *C. lutescens* Westr., *C. terrestris* Westr., and *C. neglecta* Camb. The palpal organs are very characteristic, and are shown from below in figure 3.

Epigyne.—Greyish yellow-brown except for two circular pigmented areas at the anterior end, which are yellower. They are in contact with one another in the middle line. On the outer side of each of these is a dark gibbous prominence more deeply pigmented than the rest of the vulva. These are best visible from the outer sides. Posteriorly the epigyne is prolonged backwards and has its posterior border truncated. Usually the truncated border shows an indentation in the middle. This, however, is very variable in depth, sometimes it is very marked, at others hardly discernible. The posterior part of the epigyne bears in the centre a deep depression of a somewhat straight sided oval shape.

Clubiona juvenis Simon is very distinct from all its British congeners. In size it most nearly resembles *C. trivialis* L. Koch, but is usually rather longer and narrower than that species. Most specimens have a more or less parallel-sided appearance. It is paler too than *C. trivialis*, being coloured more like *C. diversa* Camb. The sexual organs of the female resemble those of the above-mentioned species, but differ in many details and are easily recognizable. The male palpi cannot possibly be confused with those of any British species. This is a handsome addition to the fauna of the British Isles; it has occurred previously in France and Switzerland.

EXPLANATION OF PLATE 1.

CLUBIONA JUVENIS, Simon.

1. Right palpus of male from outer side.
2. Right palpal tibia from above.
3. Right palpus from beneath.
4. Epigyne from below.

In the above figures *a* represents the inferior branch of the tibial apophysis, and *b* a spine-like process at the apex. In slightly different positions the prominence *c* is much more marked.

OBSERVATIONS ON THE MOVEMENTS OF
WOODCOCK.

BY PHILIP D. PERCEVAL.

I started marking Woodcock here for my own information only, as both my keeper (who has had a lifelong experience amongst Woodcock) and myself had come to the conclusion that we are now mainly dependent for our stock during the shooting season on the birds that are bred here; it is seldom of late years that a migration of foreign birds can be noticed as they used to be in former times. While referring to this particular neighbourhood only and to what has come under my own observation, I am of opinion that the flights of foreign birds are of late years inclined to remain more in England and the eastern counties of Ireland than used to be the case, and that here in the west our home-bred birds are principally to be relied on for our stock of birds during the shooting season.

I first entertained the idea of putting rings on young Woodcock in 1908, in order to try to get some idea as to whether we got any, and if so, how many, relatively, of the birds that were bred in the place. The rings that I got that year were not satisfactory, as they had a tag on them that would be likely to get caught up in grass, &c., and probably lead to the destruction of the young birds to whose leg they were attached. For this reason, we did not use any of these, and in the following year (1909), I got rings of another make which were not very satisfactory either, but by cutting them down and filing them, we somewhat improved them, and were able to mark 16 young Woodcock. The following winter seven of the marked birds were shot, all except one being got here, and that one was got within a couple of miles from where it was ringed. The following year (1910) I succeeded in getting a satisfactory ring, but we were unlucky in dropping on but few young birds, though there were plenty about, and only a dozen had rings put on. Of these, four were shot the following winter, as well as two ringed birds of the year before (1909).

In 1911, we were again unable to catch many young birds, and I can only account for 10 rings having been put on, and that winter we shot 3 of these birds, also one of 1909, and one of 1910, and the same season two of our 1911 birds were shot in the vicinity. One was shot close to our mearing, and the other about 12 miles away.

Last spring (1912) was exceptionally bad for finding young Woodcock, as the undergrowth grew up very early, and it was nearly impossible to come across the young birds, in spite of the fact that more Woodcock than ever nested here. Seven birds only had rings put on, and of these we shot two, as well as two others having 1911 rings on. I have not heard of any of our ringed birds having been shot elsewhere, beyond those I have mentioned that were shot in this neighbourhood. Others may have been got by poachers on adjoining bits of unpreserved land about which I should naturally hear nothing. I may say that in spite of the number of Woodcock that nest here, it is always most difficult to catch the young birds, as the undergrowth is very heavy, and if one happens to drop across a clutch of young Woodcock, they run like mice, and are hidden under a fern or a bunch of leaves in a second, and are then nearly impossible to find. The only way to deal with them is to grab what one can with both hands, put them in the pocket, and then put the rings on one by one, and let them go. As a rule, the first notice one gets is to see the old bird rise up carrying one of the young and screaming; then if quick enough one may see the rest of the brood (usually four in all) running in all directions for shelter, and it is not easy to get more than one or two however quick one may be. We have noticed that it is practically hopeless to watch a nest with the idea of putting rings on the young birds when they are hatched off. Often as it has been tried here, it has never succeeded. The old bird is far too cunning, and when she knows that her nest has been discovered, she removes the young to a safer place directly they are hatched off. Though we have watched nests most carefully with a view to marking the young birds, all the satisfaction we have ever got has been to find the eggshells some morning,

and no trace of their occupants. I often wonder if this is done in every case, or only when the old bird knows that her nest has been discovered.

At the moment of writing (March 17), there appeared to be more Woodcock in this place than there have been all the winter. They are all paired and fly about in the evenings uttering the breeding note, which is quite distinct from the "croak" they make at other seasons. These birds we look upon as responsible for the stock we may expect next season. I have no doubt some are nesting already, as this is, apparently, an early season.

I have known young Woodcock hatched off the second week of March, and three years ago I knew of a bird hatching eggs as late as August 12th. As Woodcock mature very rapidly I am inclined to believe that each pair rears more than one brood in the season.

At "Classiebawn," Mr. W. Ashley's place in this county, his keepers have put rings on quite a large number of Woodcock during the last two or three years. They have better facilities for finding them than we have here, as some of the woods they nest in are less liable to heavy undergrowth, and the birds are more easily found. They put rings on 50 last spring, and on 48 the year before. Of these, nineteen have subsequently been accounted for, and beyond one of their birds that was shot here, I have not heard of any of their ringed birds being got outside their own coverts.

The accepted theory amongst many sportsmen, is, that the birds that are bred here go away, and that possibly some may return. I admit that some may, and do leave us, but from my own observations, and from those of others better qualified to give their opinions than I am, I believe that most of the birds bred here remain with us all through the year. There is not a month during which plenty of Woodcock cannot be seen here; sometimes they are in the old woods, sometimes in spinneys, and sometimes on heather. Where they are depends on the time of the year, and the conditions of weather.

NOTES FROM THE SKELLIGS.

BY P. J. MACGINLEY.

(With a Prefatory Note by the late R. J. USSHER, D.L., M.R.I.A.).

I forward a further communication from Mr. P. J. MacGinley, light-keeper on the Great Skellig, some of whose previous observations have appeared on p. 178 of this volume. I sent him a copy of the *Irish Naturalist* for June, 1899, which contains some observations by Mr. E. M'Carron on the Razorbill.

R. J. U.

In Mr. M'Carron's observations on the Razorbill,¹ it is stated that "young Razorbills leave their nesting-places in the night-time. . . . The young ones are jostled all the way down to the sea by the old ones. If the young one rests too long, the old one shoves it on, and on it goes, rolling and tumbling and falling sometimes down steep cliffs."

I must say that I have never witnessed the young Razorbills topple down the cliff when they are being taken away. At an altitude of close on 600 feet it would be a cruel process. There are Razorbills nesting here close on 600 feet high where the cliff is by no means overhanging, and where if the young bird was once started off the ledge and not assisted by the parent clear of the cliff—the first fall—there it would remain in a crevice, or get killed on the serrated edges of the rocks. As I have said previously (p. 178 *supra*), I have watched them evening after evening bring their young away, and after sunset, just as night falls they leave. Directly over our landing where I spend my evenings fishing there are numbers of these birds, so there is no doubt about the time of the departure of the young. One could not help but see them leave, one's attention being always drawn by the old birds continually screaming in the flight down with the young one and for some time

¹ *Irish Naturalist*, vol. viii., 1899, p. 135.

after they reach the water. I have never witnessed the older birds, having any difficulty coaxing the young to sea : as soon as the young reaches the water it dives with the older birds, and they accompany it on either side to the deep. In a case of its toppling down the cliff from a height at which some of our birds build I can easily imagine their difficulty.

An instance that I have observed of a young bird toppling down was that of a forsaken Puffin when the parents had left with the flock. In the case of the Puffins they lay their eggs almost anywhere they can get their heads ; in every burrow, large or small, underneath every stone can be found a Puffin's egg. The rock is almost covered with these birds. At any hour of the day one can see these birds bring the food. When the young are small they bring the small " fry " 8 and 9 and sometimes 10 at a time, but this time of the season (August) as the young ones become strong, they bring home a single fish about $3\frac{1}{2}$ inches or 4 inches long.

The young leave with the flock in the morning early. They are strong, fully feathered before they attempt to go, but many of them are forsaken before they are able to go. In that case they ramble out of the nests, and topple down the cliff. If not devoured by the Royal Gull they meet with a fall equally bad. Hundreds of them are killed in this way. When the greater number of the birds have left, few ever return to feed any of the late young ; but there are exceptions, as I write this the Puffins are gone, and a single bird can be seen coming with food to its young. They do not rest on the rock at this stage but fly straight into the nest, drop the food and out to sea again.

The Puffin will allow itself to be hauled out of the nest by holding on to a piece of stick or anything it catches. These are wonderful birds regarding their fighting propensities. I have lifted them off the ground over four feet with a piece of stick underneath their chin they having such a firm hold of each other before their releasing that hold ; and at this time they were after falling close on 100 feet,

never letting go the original hold. There are numerous cases where the weaker gets exhausted and dies fighting, but the extraordinary part is, in case of their dropping into the sea they always separate before touching the water.

It would be hard to credit that the graceful little Kittiwake fights with such determination that there was a case last year here of a pair of them drowning each other. I have often seen them fight for possession, but never with such venom as the solitary instance I mention.

I have never seen the Shearwaters in daylight coming to or leaving their nests. If caught in the burrow (their nest) after dawn, they remain there all day till night sets in. Hundreds of these birds breed on Puffin Island, where they can be seen in flocks after sunset hovering round till dark sets in, but they never have any intercourse with their nests while there is daylight.

Their nest is a deep rabbit-burrow, sometimes seven or eight feet underground, or underneath a large rock, where hidden from view they feed their young throughout the night, for they never bring food nor are seen there at all in the day-time. In the night-time also the young leave. I have often found them in the early morning, they having struck the protection-rail on their downward flight when leaving. By the aid of the light one can see these birds hovering round incessantly screaming, but all is silent as day dawns.

The Stormy Petrels can be found on their nests underneath the stones at any time during the day. They are not seen feeding, or having any intercourse with their nests in daylight. They are night-birds also, very easily attracted by the light with evil consequences—many of them are killed in this way, especially later on when the young are leaving. Every dark night they are round the light, but are never seen in the day-time, except on the nest. They feed and bring their young away in the night-time also. The young of those birds are the best developed I know before they leave. One could hardly discern any striking difference in size between the parents and offspring. They are the last that leave here, generally about the middle of September.

With regard to the contention of Mr. M'Carron that the bird which passes as the "Young Razorbill" is a distinct species from the common Razorbill,¹ I am more inclined to favour Mr. Barrington's view of there not being two species of Razorbill. The birds that are mentioned as young Razorbills are quite common here from the month of December to the middle of March. In Wicklow Bay, Blacksod Bay, Carlingford Lough and Ballycottin Bay they are very numerous. Even in Valencia last year I saw some of them caught in nets, but in Blacksod Bay especially they are very numerous.

Great Skellig Lighthouse, Co. Kerry.

REVIEWS.

THE FALCON'S NEST.

The Peregrine Falcon at the Eyrie. By FRANCIS HEATHERLEY, F.R.C.S., London: Offices of "Country Life," 1913. Pp. 80, with many photographs. Price 5s. net.

In this splendidly illustrated book, Dr. Heatherley has made a revelation of the domestic life of the Peregrine which he brings before us in a long series of most excellent photographs. These show the bird and its young in various poses and actions while the brooding and feeding of the nestlings was going on. It excites our wonder that so wild and watchful a creature would endure the erection of a shed on trestles lashed with ropes within a few feet of its eyrie; though to a certain extent an object of suspicion, and daily disturbed by the change of occupant, this structure never interfered with the attendance on the young by their male parent, who proved a most devoted and expert nurse, leaving it to the female to provide the food supply. This consisted largely of Puffins as well as Thrushes and other land-birds, the feathers and bones being offered to and swallowed by the nestling Peregrines. Feeding went on at intervals from dawn through the morning and evening, being generally discontinued in the middle of the day. The bits that were dropped were carefully picked up and given again to the young, unlike the custom of Auks and Gannets which leave a fish when once it has fallen, though they have to go so far to get another. The food-note is described and another call to urge on the young to take food, also the alarm cry and several other expressions of bird language peculiar to the Peregrine. The site chosen for the eyrie does not seem to be so precipitous as is usual in Ireland, where a cliff almost always overhangs it (*see* "Birds of Ireland," p. 142, and "Our Rarer British Breeding Birds," by Kearton, p. 26).

¹ *Irish Naturalist*, vol. viii., 1899, pp. 132-134.

Careful notes are given with each plate of the photographic data, and a section is devoted to this subject which will be useful to bird photographers. The shed and its erection are described, and the endurance of the observer, who was daily relieved by another, does not seem to have been tested so severely as that of Mr. Macpherson ("Home Life of a Golden Eagle").

Dr. Heatherley has nothing but reprobation for egg-collectors, and adopted the singular expedient of defacing eggs with a blue pencil and replacing them in the eyrie, where they were hatched out, another instance of the Peregrine's tolerance of interference with her home. Bird-photography has made wonderful advances since the brothers Kearton produced the first books devoted to the subject, but collections of skins, and eggs, at least for museums, are more necessary than Dr. Heatherley would allow—though there are some collectors who fully deserve his denunciation.

R. J. USSHER.

RURAL BOTANY.

Weeds: Simple Lessons for Children. By ROBERT LLOYD PRAEGER. With Illustrations by S. Rosamond Praeger and R. J. Welch. Cambridge University Press, 1913. pp. x. + 108, 3 Plates, 45 illustrations. Price 1s. 6d. net.

This is one of the Cambridge Nature Study Series, and some idea of its scope may be gained from the titles of the six chapters:—I. What Weeds are, and their place in the Plant World. II. The Life of a Plant. III. On Weeds in general. IV. Seeds and their ways. V. The War against Weeds. VI. Some Common Weeds. It is written in an agreeable and easy style, and there is no one better fitted than its author to discourse on such a subject. As might perhaps be expected the examples of weeds and their ways are chiefly drawn from Ireland. Each chapter is followed by a set of practical exercises, and it would be difficult to conceive of any more useful form of instruction in Irish rural schools than working through these. As an additional recommendation for its use in this country the Irish name of each weed described is given in addition to its English name. There are a few slips in the book, but none of serious consequence, and in a few cases the author's meaning is hardly sufficiently clear. On p. 9 where the Poplar is mentioned among the native trees of Ireland it is doubtless the Aspen that is meant. The Cuckoo Pint is mentioned (p. 20) along with Bracken and Couch Grass as having a creeping stem, but the distance travelled by the short tuberous stem of the first-named must be very slight each year. The hairs of the Nettle are said (p. 97) to contain formic acid, and up to recent years this was supposed to be the case; but Solereder in his "Systematic Anatomy of the Dicotyledons" states that the acid is not formic.

These, however, are minor matters and in no way detract from the usefulness of the book. As regards the illustrations it is sufficient to say that they are of the high quality associated with the names of both artists.

J. A.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Suricate from Mrs. Rowan, Undulated Grass Parakeets and Cockateels from Mr. A. Goodbody, two Peahens from Mr. J. Collin, and a Great Northern Diver from Mr. J. Keith. A Striped Hyaena, a Hooded Crow, a pair of Peafowl, a Yokohama Cock, a pair of Hen Harriers, and a Merlin have been received on deposit.

The Society has sustained a great loss by the death of Patrick Supple who has been over fifty years keeper in the Gardens, and for most of that time has been in charge of the Monkey House.

DUBLIN MICROSCOPICAL CLUB.

OCTOBER 8.—The Club met at Leinster House. J. H. WOODWORTH (President) in the Chair.

Prof. G. H. CARPENTER showed a new species of *Petrobius* from the shore of Portrane, Co. Dublin, with drawings showing the structural details by which it may be distinguished from the common *P. maritimus* Leach. It will shortly be described and figured in the *Irish Naturalist*. He also demonstrated the presence of a few minute but distinct teeth at the apex of the mandible in the final cuticle as formed beneath that of the penultimate instar before the last moult. It seems that these teeth are worn down immediately after the moult, so that the untoothed mandibular apex becomes a generic character for *Petrobius*.

N. COLGAN exhibited a series of slides illustrating changes effected during the process of growth in the form of the radula in certain species of opisthobranch mollusca. Amongst the species selected as affording instances of these changes were *Aplysia punctata*, *Tritonia plebeia* and *Dendronotus arborescens*, in all of which the broad lingual ribbon is composed of several transverse rows of teeth, each row having a large central tooth flanked on either side by numerous smaller lateral teeth or uncini. The radula or lingual ribbon of a 6 mm. specimen of *Tritonia plebeia* was shown to have 26 rows, of which the widest had 50 laterals on either side, while the radula of a 20 mm. specimen of the same species had 38 rows with 70 laterals. In *Aplysia* the number of rows and of laterals in the widest row was found to vary from 21 and 10 in a specimen 12mm. long to 46 and 17 in a specimen 175mm. long. These numerical variations were found to be accompanied by variations in the form of the teeth in the direction of blunting or simplification of outline with increasing age and size. Thus in *Dendronotus arborescens*, the tips of the uncini, sharply denticulate in the younger and smaller individuals, became quite smooth in the largest specimen. In *Aplysia* the growth changes were most conspicuous in the central teeth whose outline became remarkably altered by unequal development of the parts. Examination of a large

series of nudibranch radulae led the exhibitor to conclude that such changes, in so far as they affect the dental formula or number of teeth, were common to the whole sub-order Nudibranchiata, and in each species continued to take place throughout the life of the animal.

D. M'ARDLE exhibited a germinated spore of *Tetraphis pellucida* with protonema, showing the peculiar frondiform leaves which appear at the first development of the moss stem; they are ligulate or ovate-spathulate in shape from a narrow base; in this species they disappear before the development of the moss stem is completed and are rarely to be seen. In the other native species *T. Brownianum* these curious leaves are persistent, and form a tuft of radical frondiform leaves, which are sometimes divided like the fronds of the Forked Spleenwort. A North American species *T. geniculata* differs from the others in the absence of the gemmae, and above all in the geniculate pedicel. In *T. repanda* which is found in France and elsewhere on the Continent the frondiform leaves are replaced by minute flagelliform shoots bearing very minute nerveless leaves. The specimens exhibited were collected recently on a peaty bank in the Glen of the Downs, Co. Wicklow.

NOTES.

BOTANY

Stachys Betonica, etc., in West Cork.

Included in a small collection of plants sent me by a friend from Castle-town Berehaven was a specimen of *Stachys Betonica* gathered near Garinish Point, about ten miles west of the village. It grew on a heathery slope between the road and the sea near the White Strand, and was only noticed in one spot. This is a very interesting restoration to the County Cork flora. It was recorded by Drummond so long ago as 1819 as growing "in the baronies of Bere and Imokilly, Cork," but has been quite lost sight of in the county for nearly a hundred years. Among other plants sent me from this locality were *Spiranthes autumnalis*, gathered near the roadside a little west of White Ball Head; *Verbena* in several localities about the village; and *Wahlenbergia* found near the village of Eyeries on the Kenmare Bay side of the Slieve Miskish mountains, about four miles north west of Berehaven. The *Stachys*, *Spiranthes* and *Verbena* were found by Mrs. Crookshank, the *Wahlenbergia* by Miss Mary Crookshank. Now that Drummond's old record for the Barony of Bere has been proved correct, there is every reason to hope that it will be refound in the Barony of Imokilly also, which would restore this plant to the East as well as to the West Cork divisions of Praeger's "Irish Topographical Botany."

Dundrum.

REGINALD W. SCULLY.

Interesting Hepatics from Co. Kerry.

In July, 1913, Mr. Praeger sent me two Hepatics found by him near Brandon Mountain, in Iveragh, Co. Kerry, which were so unusual that I sent them to Mr. Macvicar, of Invermoidart, for his opinion. One, which forms tufts in several feet of water on the sandy bottom of Lough Doon, near Connor Pass, I took for a form of *Scapania undulata*. I have gathered a similar plant in pools on Carlingford Mountain, in Co. Louth. On this Kerry plant, Mr. Macvicar writes:—"I consider the submerged *Scapania* as rather belonging to *S. dentata* than to *S. undulata*."

The other plant grew on the bottom of the highest tarn on Brandon Mountain at an altitude of 2,500 feet, where it forms patches in three to six feet of water. Mr. Macvicar says of this:—"The *Aneura* is most curious; the thallus is 7-9 or more cells in thickness. I am inclined to place it to *A. pinguis* as a submerged form. The colour and crispness seem to belong to that species."

H. W. LETT.

Loughbrickland, Co. Down.

Helvella crispa in Co. Donegal.

Mr. W. E. Hart forwards a fine specimen of *Helvella crispa* found by Miss Mary Colgan at Kilderry, Co. Donegal. Mr. Hart reports that the fungus is of frequent occurrence at that place. The only previous Ulster records appear to be from Down (Waddell) and Armagh (Lett), in Canon Lett's paper on the Fungi of N.E. Ireland in the *Proceedings* of the Belfast Field Club. Mr. A. D. Cotton, of Kew, kindly confirmed Mr. Hart's identification.

Dublin.

R. LL. PRAEGER.

ZOOLOGY.

Mollusca from the Great Saltee Island.

Mr. Stelfox asked me to collect mollusca during my visit to the Saltees last June. I was too much occupied to pay much attention to this group, but sent the few I got to Mr. Stelfox, who suggests the publication of the names:—*Limax arborum* var. *maculata*, Roebuck; *L. maximus*, *Agriolimax agrestis*, *Arion intermedius* (dark grey form), *Pyramidula rotundata*, *Hygromia hispida* (flat "eastern" form), *Helicella virgata* (same form as occurs on mainland of Wexford), *Helix nemoralis*, *Pupa cylindracea*.

Dublin.

R. LL. PRAEGER.

Black Tern on Migration at Tuskar Light-station.

On August 31st, at 1 a.m., a Black Tern was picked up on the balcony of the Tuskar lighthouse by Mr. Glanville, and kindly forwarded to me in the flesh.

C. J. PATTEN.

University, Sheffield.

Iceland Gull in July and Mealy Redpoll on Inishtrahull.

An Iceland Gull appeared on Inishtrahull on Friday, July 18th last. I found, on obtaining the bird, that it was changing from the white to a later phase of plumage. I am not sure if this bird has been recorded previously as occurring in Ireland in July. In his "Birds of Ireland," Mr. Ussher points out that July is the only month the Iceland Gull has not been obtained.

On September 24th at noon, a Mealy Redpoll fluttered down the chimney of one of the islanders' cottages, and was brought to me. It was uninjured, and is feeding well in a cage.

University, Sheffield.

C. J. PATTEN.

Stock Doves in County Fermanagh.

Last year (1912) I picked up a Stock Dove (*Columba aenas*) in the garden here, the first I had ever seen in this county; it was in a very emaciated condition, and died in a few days. This summer two pairs nested in the garden, but I do not know whether they reared any young or not, as I was away at the time they should have flown.

Tempo, Co. Fermanagh.

CHARLES LANGHAM.

Spotted Flycatchers at Portlaw.

On the 24th August last, I watched a number of Spotted Flycatchers. They were all settled on the wire fences surrounding two tennis courts in the garden here. Eleven birds I was able to count for certain, but there probably was a larger number. Their activity prevented me from counting more. It was an interesting sight. They came at times so close, I could hear the snapping of the bill. They were all very busy, taking short flights to catch their insect prey. But the point of my note is this:—They all, with one exception, disappeared on the following day. I think it can hardly be doubted that they disappeared to perform their autumnal migration. It was certainly not scarcity of food that urged them to leave. The supply of Flycatchers' food is abundant here, too abundant to be pleasant to human beings. I have just consulted Mr. Barrington's great work, "Migration of Birds," and find that he records instances of Spotted Flycatchers killed at Irish lights at the extraordinarily different dates of July 21, September 21, October 2 and 20, November 20–30. These were all single birds, and were killed in 1895, 1887 (two), 1889, and 1897. I think it can be inferred from what I noted that the time of the *general* autumnal migration of the Spotted Flycatcher is about the end of August. In exceptional years birds begin to leave us about the middle of July, and stay with us sometimes even till the end of November.

Coolfin, Portlaw, Co. Waterford.

W. W. FLEMYNG.

Tree-Pipits and Pied Flycatcher on Migration at Tuskar Light.

A Tree-Pipit was obtained on Tuskar Rock, on August 31st. Two were obtained striking on the night of 3rd-4th September, and two on the night of the 4th-5th September. Two were found dead in the early morning of September 5th. To Mr. Glanville, Principal Keeper, I owe my cordial thanks for his kindness in forwarding the specimens and particulars. I hope to publish details later on.

On September 5th, at 2.40 a.m., a Pied Flycatcher struck the Tuskar lighthouse, and has been forwarded to me in the flesh by Mr. Glanville. I am greatly indebted to Mr. M'Ginley for collecting the specimen.

University, Sheffield.

C. J. PATTEN.

Tree Pipit and Pied Flycatcher at Rockabill.

On the 3rd of September, Mr. F. J. Duffy, lightkeeper at Rockabill, Co. Dublin, found two birds dead at the base of the tower; one, he suggested, might be a Short-toed Lark, the other, with white on its wings, he did not know. Both were forwarded to me in the flesh; the "Lark" proved to be a female Tree-Pipit in fair condition, the other, a young Pied Flycatcher.

Dr. Patten has already recorded (*Irish Nat.*, November, 1912, p. 209) the Tree-Pipit from the Tuskar Rock, Co. Wexford; one obtained on September 10th, another on September 22nd, being the first authentic occurrences in Ireland. Although Dr. Patten states that he was familiar with the appearance of the Tree-Pipit at Sheffield, he does not appear to have recognised it at first. He suggests that it was emigrating from Ireland, and that Irish ornithologists should use every effort to prove that it breeds there.

This species has been met with in some numbers by Mr. Eagle Clarke in St. Kilda in the autumn and is a great straggler, and the fact of its occurrence in September at the Irish light-stations does not prove that it breeds here and was emigrating, any more than the Pied Flycatcher, which was got dead at the same time, being the eleventh autumnal specimen of this species forwarded to me from Irish lighthouses since 1886.

RICHD. M. BARRINGTON.

Fassaroe, Bray.

Aquatic Warbler on Migration at Tuskar Light-station.

I have had the pleasure of identifying an Aquatic Warbler from Tuskar light-station. I am much obliged to Mr. Glanville, who picked the bird up dead on the rock at 4.45 a.m. on August 9th, and sent it to me in the flesh. Full particulars will be given later.

University, Sheffield.

C. J. PATTEN.



RICHARD JOHN USSHER.

RICHARD JOHN USSHER.

A true conception of the position Mr. R. J. Ussher occupied amongst Irish naturalists cannot be readily conveyed. Amongst Irish ornithologists, he was *facile princeps*, the "Recording Angel," and had at his fingers' ends all the records of the distribution, county by county, of the Irish avifauna. As a speleologist, he also took first place; no Irishman, and few Englishmen, have spent the same amount of time and money in excavating caves.

He was born on the 6th April, 1841, and after a short illness, died on the 12th October, 1913, aged 72 years, and was buried in the family vault at Whitechurch, near his residence, on October 15th. His father, who married a daughter of Colonel Grant, at one time Governor of Upper Canada, was 63 years old at the time of R. J. Ussher's birth, so that the two lives extended over a period of 135 years. The subject of this memoir was the only child of the marriage who survived beyond infancy. At the age of twelve, he was sent to a school at Portarlinton, and subsequently to Chester. When he was thirteen, his father died, and, as he was delicate, his mother kept him at home, where he was educated by a tutor, and entering Trinity College, Dublin, he passed his Little-go as a non-resident student, but owing to ill-health, never took his degree, but spent successive winters with his mother and a tutor in Spain, Italy, Corfu, and elsewhere.

When twenty-five, he married the eldest daughter of the Rev. John Finlay, of Corkagh House, Co. Dublin, and again travelled abroad for some years. He then devoted himself with energy to public duties in his own county, being, at the time of his death, its oldest magistrate save one. He became Deputy Lieutenant, Grand Juror and High Sheriff, and taking a great interest in Church matters, was for many years a member of the General Synod. In politics he was a strong Unionist, and as a resident landlord, he occupied the house which his father had built amidst beautiful grounds, and overlooking artificial lakes.

His interest in natural history was partly inherent, for as a boy he was fond of egg-collecting, and this taste

was developed chiefly owing to the circumstances of his life, for in 1877, his wife became a confirmed invalid, and under this great family sorrow, relief was found in his old love for ornithology. His summers were spent at Ardmore on the coast of Waterford, where the cliffs and sea-birds were a constant source of attraction, and Ussher became an expert climber and great egg-collector. It was here he gave the Keartons their first lessons in cliff-climbing.

Almost every part of Ireland was visited in ceaseless search for the breeding-haunts of rare birds, and the assistance of correspondents was enlisted in nearly every county so that his egg-collection became almost unique, it ; was acquired some years ago by the National Museum in Dublin. After its removal from Cappagh, he gave up egg-collecting, but his energy as an ornithologist was even greater than before. Annual summer journeys, not only to the cliffs and islands of the west coast, but also to the lakes and marshes of the Midlands were undertaken, often as a delegate from the Irish Society for the Protection of Birds, with the object of supervising the watchers. So late as last June, he was instrumental in detecting, while with the writer, the duplicity of one of these men, who indirectly was actually selling the eggs of the bird he was supposed to protect.

Many naturalists visited Ussher in his home at Cappagh ; Prof. Leith Adams, Seeböhm, Howard Saunders, the brothers Lindner from Germany, and several others. The Great Saltee Island, off the coast of Wexford, famous for the number and accessibility of its sea-birds was a favourite rendezvous, and an expedition there was organised last June. German, English and American visitors were invited and enjoyed a delightful time, sleeping in the old deserted farmhouse, towards the repairing of which Ussher contributed liberally.

Students of ornithology in Ireland have been singularly few, compared with those of Great Britain, and no book worthy of the name dealing with its birds in detail was published in the last century, except the three volumes of William Thompson, 1849-51. From that time down to 1900, with the exception of A. G. More's valuable "List of Irish

Birds," 1885 and 1890, one was at a loss to know where to seek for information. Papers and notes were scattered everywhere, and the contents of private collections were practically unknown. Ussher, after immense labour and correspondence, tabulated and extracted everything he considered of value. Possessing leisure, enthusiasm and knowledge, and being a persistent and unwearying letter-writer, he collected material from all sources with astonishing assiduity, and we have the result in the well-known "Birds of Ireland," a volume which will hold its own with any of a similar type for painstaking and original work. It is not merely a topographical ornithology, it also contains descriptive notes on the habits of birds; some of this information is new, and almost all of it is simply and happily expressed.

If Ussher had any fault, it was being over-patient with correspondents, whose feelings he would avoid hurting by any show of incredulity. He delighted to encourage poor men, by presenting them with books and pamphlets on natural history, and for their benefit he wrote long letters of explanation.

Next to the "Birds of Ireland," perhaps the most laborious work he undertook was revising More's "List of Irish Birds" for the National Museum, and writing Part XX. (Aves) for the Clare Island Survey report. A list of his more important papers is given hereafter.

He was fond of archæology, and it was Prof. Leith Adams who chiefly aroused his interest in cave-digging, and Ussher published with him, and also in conjunction with Dr. Scharff and others, many papers on cave-exploration (mentioned in appendix). The brunt of the labour, and a large share of the expense were always borne by him. He thoroughly enjoyed working underground, and provided himself with a complete digging equipment, his clothes being partly covered with stout leather, to avoid injury or abrasion. So far back as 1879, he contributed a paper to the *Zoologist* on a cavern near Cappagh. He explored with Leith Adams the Shandon Cave, and the limestone cave on his own property at Ballynahemery, and after Prof. Adams' death, the Keshcorran Caves in Sligo, the Edenvale Cave in Clare, and the Castle Pook Cave near Doneraile.

He was always accompanied by his faithful valet, John Power, and usually erected a hut at the mouth of the cave, spending weeks laying bare the bones of Mammoth, Bear, Red Deer, Hyaena, three species of Lemming, etc. He was the first to discover in Ireland the Hyaena and the Lemmings. Thousands of bones, and many interesting prehistoric human relics have been deposited in the National Museum, Dublin, as a result of his work. The writer well remembers a visit paid to Castle Pook; when shown into his "room"—viz., one side of the hut—the huge shoulder-blade of a mammoth just exhumed was found laid out on the bed. Nothing, however, pleased Ussher more than the finding of the remains of the Great Auk in Co. Waterford and other localities; at the time of his death, he was preparing a further report on cave-exploration.

Although by no means a rich man he gave a few years ago, a sum of £300 to the Royal Irish Academy to promote the study of zoology in Ireland, including researches in Irish caves, and he bequeathed to the same body all his manuscripts, books, schedules, notes and papers on natural history, cave-exploration and antiquities, and the hut in which he resided when engaged in cave-work, with its furniture and equipment. He recommended Mr. C. B. Moffat, Dr. R. F. Scharff, and the writer of this memoir for the administration of the above.

In appearance, he was a fairly big man, almost six feet high, well set-up, with reddish hair and beard. He had a rugged, but good-natured face, kindly blue eyes, and a quiet, courteous manner. He was anxious about detail, fond of children, and ready to explain with great minuteness. Gentle, yet resolute, he was sometimes inclined to be credulous, this failing was best overcome by the good-natured jokes of those who knew him well. It has been truly said that "his integrity, unfailing courtesy, and strong desire to be fair to those with whom he might differ, were bound in the end to win him approval, or at least respect." Deeply religious, he carried his principles into practice and bore himself with great patience in adversity.

R. M. BARRINGTON.

LIST OF BOOKS AND MORE IMPORTANT PAPERS

BY R. J. USSHER, D.L., M.R.I.A.

A.—ON CAVE EXPLORATION AND PALAEOLOGY.

1879. On the Discovery of an Ossiferous Cavern near Cappagh, Co. Waterford. *Zoologist* (3), vol. iii., p. 331.
- 1879–83. Reports on Caves and Kitchen-middens, in *Brit. Assoc. Reports* : 1879, p. 338 ; 1880, p. 210 ; 1881, p. 218 ; 1882, p. 240 ; 1883, p. 132.
- 1879 [with A. LEITH ADAMS]. Notes on the Discovery in Ireland of a Bone-cave containing remains of the Irish Elk apparently co-existent with Man. *Sci. Proc. R. Dublin Soc.*, vol. ii., p. 234.
- 1880 [with G. H. KINAHAN]. On a Submarine Crannog discovered at Ardmore, Co. Waterford. *Proc. R. I. Acad.*, vol. xvi., p. 61.
- 1881 [with A. LEITH ADAMS and G. H. KINAHAN]. Explorations in the Bone-cave of Ballynamindra, near Cappagh, Co. Waterford. *Trans. R. Dublin Soc.* (2), vol. i., p. 177.
1885. Description of Objects found in the Kitchen-middens of Rathes. *Journ. R. Hist. and Arch. Soc., Ireland* (4), vol. xii., p. 362.
1895. Notes on the Irish Caves. *Irish Nat.*, vol. iv., p. 92.
1897. Discovery of Human and other remains with materials similar to those of a Crannog high above the present Valley of the Blackwater between Lismore Castle and Cathedral. *Proc. R. I. Acad.*, vol. xx., p. 550.
1897. The Discovery of Bones of the Great Auk in Co. Waterford. *Irish Nat.*, vol. vi., p. 208.
1899. The Great Auk, once an Irish Bird. *Irish Nat.*, vol. viii., p. 1.
1902. Evidence of the Caves. *Proc. Belfast Nat. Hist. Phil. Soc.*, p. 35.
- 1903 [with R. F. SCHARFF, G. COFFEY, G. A. J. COLE, and R. LL. PRAEGER]. The Exploration of the Caves of Kesh, Co. Sligo. *Trans. R. I. Acad.*, vol. xxxii. B., pt. 4.
1905. On the Discovery of Hyaena, Mammoth, and other extinct Mammals in a Carboniferous Cavern in Co. Cork. *Proc. R. I. Acad.*, vol. xxv. B., p. 1.
1906. The Hyaena Dens of the Mammoth Cave near Doneraile, Co. Cork. *Irish Nat.*, vol. xv., p. 237.
- 1906 [with R. F. SCHARFF, G. COFFEY, G. A. J. COLE, and R. LL. PRAEGER]. The Exploration of the Caves of Co. Clare. *Trans. R. I. A.*, vol. xxxiii. B., pt. 1.
- 1908 [with R. F. SCHARFF, H. J. SEYMOUR, and E. T. NEWTON]. On the Cave of Castlepook near Doneraile, Co. Cork. *Brit. Assoc. Rep.*, p. 697.
1908. Supposed Black Grouse and Ptarmigan from Irish Caves. *Brit. Birds*, vol. ii., p. 167.
1910. Cave Hunting. *Irish Nat.*, vol. xix., p. 37.
1912. Marine Shells in Inland Kitchen-middens. *Ib.*, vol. xxi., p. 28.

B.—ON ORNITHOLOGY.

- 1879-83. [Many Notes in *Zoologist* (3) vols. iii.-vii].
1883. The Siskin in Ireland. *Zoologist* (3) vol. vii., p. 493.
1884. Irish Breeding-stations of the Gannet. *Zoologist* (3) vol. viii., p. 479.
1885. Two days in the Comeragh Mountains. *Ib.*, vol. ix., p. 88.
- 1884-6. [Many Notes in *Zoologist* (3) vols. viii.-x.]
1886. Bird life on the Saltees and the Keraghs, Co. Wexford. *Zoologist* (3) vol. x., p. 88.
- 1886-92. [Many Notes in *Zoologist* (3) vols. xi.-xvi. and *Field*, vols. lxxvii., lxxviii., lxxx.]
1889. The Invasion of Crossbills in the east of France. *Zoologist* (3) vol. xiii., p. 70.
1889. Crossbill breeding in Co. Waterford. *t.c.*, p. 180.
1890. On the Coast of Connaught. *Zoologist* (3) vol. xiv., p. 361.
1890. Nesting of the Crossbill in the Co. Waterford. *t.c.*, p. 199.
1891. Crossbills and Siskins breeding in Co. Waterford. *Zoologist* (3) vol. xv., p. 311.
1892. The Crossbill in Ireland. *Irish Nat.*, vol. i., pp. 6, 28.
- 1892-1913. [Many Notes in *Irish Naturalist*, vols. i.-xxii. See R. M. Barrington's Index to vols. i.-xviii.]
1893. The Breeding of the Garden Warbler in the Shannon Valley. *Ib.*, vol. ii., p. 185.
1893. The Birds of the Midland Lakes and Bogs. *Ib.*, vol. ii., pp. 231, 261.
1894. Report on the Breeding Range of Birds in Ireland. *Proc. R. I. Acad.*, vol. xix., p. 401.
1894. The Birds of the Co. Cork. Cork.
1895. An Ornithological Exploration in Donegal, Fermanagh, Sligo, and Roscommon. *Irish Nat.*, vol. iv., p. 142.
1896. The Birds of Connemara. *Ib.*, vol. v., p. 319.
1896. On the Reported Occurrence of the Gold-vented Thrush and Spotted Eagle-Owl in Ireland. *Zoologist* (3) vol. xx., p. 161.
1897. [Notes on Lesser Redpoll and Forktailed Petrel. *Field*, vol. lxxxix., p. 1015, and vol. xc., p. 972.]
1897. The Distribution of Birds Breeding in Ireland. *Irish Nat.*, vol. vi., p. 64.
- 1900 [with R. WARREN]. The Birds of Ireland. Dublin and London.
1901. The Great and Sooty Shearwaters on the South Coast. *Irish Nat.*, vol. x., p. 42.
1901. The Colours of Guillemots' Eggs. *Nature*, vol. lxxv., p. 5.
1902. The Bird-Fauna of Ireland as affected by its Geography. *Brit. Assoc. Report*, p. 658.
1904. Birds met with in the Shannon Valley. *Irish Nat.*, vol. xiii., p. 101.
1904. Birds and their Breeding Habits. *Report Belfast Nat. Field Club* (2) vol. v., p. 97.
1905. Birds met with on the Connaught Lakes. *Irish Nat.*, vol. xiv., p. 125.

1908. A List of Irish Birds. Dublin (National Museum).
 1910. Birds of Rosapenna. *Irish Nat.*, vol. xiii., p. 170.
 1911. The Fulmar Petrel breeding in Ireland. *Ib.*, vol. xx., p. 148.
 1911-13. [Notes in *British Birds*, vols. v.-vii.]
 1912. Clare Island Survey. Aves. *Proc. R. Irish Acad.*, vol. xxxi., pt. 20.

C.—ON MAMMALS.

1882. Notes on Irish Red Deer. *Zoologist* (3) vol. vi., p. 81.
 1898. Breeding of the Marten in Co. Waterford. *Irish Nat.*, vol. vii., p. 171.
 1908. Supposed Occurrence of a Wild Cat in West Cork. *Irish Nat.*, vol. xvii., p. 140.

IRISH SOCIETIES.

DUBLIN NATURALISTS' FIELD CLUB.

SEPT. 20.—EXCURSION TO GLENASMOLE.—In spite of very threatening weather a small party assembled at Terenure about 11 o'clock in the morning, and proceeded by car to the upper reservoir of the Rathmines Waterworks, which was reached soon after mid-day. The afternoon unexpectedly proved quite fine, and a few hours were pleasantly spent in botanizing round the head of the glen from the old burial ground of Saint Ann's up to Castle Kelly. The Spotted Mimulus (*Mimulus guttatus*), a North American alien introduced at Castle Kelly some fifty years ago, was found in abundance, and here and there still in flower, along the overflows of the stream and in the retaining walls of the catchment channel which intercepts and carries down to the lower reservoir the waters destined to maintain the level of the Dodder river. In these walls, too, a Hawkweed (*Hieracium umbellatum*) appeared in abundance, and the peaty margins and parts of the floor of the upper reservoir, laid bare over wide areas by the long-continued drought, yielded great sheets of the Water Purslane (*Peplis Portula*) and the Marsh Cudweed (*Gnaphalium uliginosum*). Near the old burial ground many fine stocks of the Guelder Rose (*Viburnum Opulus*) one of our handsomest native shrubs, by no means common in Dublin, were found in full fruit. In the "free-stone" tracts along the river at Castle Kelly appeared a few plants of the Wormwood (*Artemisia Absinthium*), an alien long established, though nowhere abundant in the upper Dodder valley. Tea was provided about 4 o'clock at Mrs. Healy's, near Bohernabreena, and an hour's drive thence took the party back to the starting-point at Terenure by way of Old Bawn and Tallaght.

THE IRISH SPECIES OF PETROBIUS.

BY PROFESSOR GEORGE H. CARPENTER, B.SC., M.R.I.A.

(PLATES 2, 3).

(Read before the Dublin Naturalists' Field Club, 9th December, 1913).

Bristle-tails or "Rock-jumpers" of the species described more than a century ago by Leach (1809) as *Petrobius maritimus* and recorded and figured in Lubbock's well-known "Monograph of the Collembola and Thysanura" (1873) as *Machilis maritima*, are very common around the Irish and British coasts. They may usually be found under the stones of the beach, or in the cracks of rocks close to high-water mark, but they are by no means confined to the tidal margin. On Howth Head, for example, specimens inhabit the tops of the cliffs, and on Clare Island, Co. Mayo, these insects abound among the loose stones of the walls that border the roads along the shore.

In a recent paper (1913) contributed to the Natural History Survey of Clare Island, I have defined and figured with some detail the characters of the common *Petrobius* which may be regarded as *P. maritimus* Leach, and I have incidentally pointed out that a second and very distinct species of *Petrobius* is found in Ireland. This latter is much rarer than its relation, and so far, specimens have been obtained nowhere else than at Portrane, Co. Dublin.

Genus **Petrobius**, Leach (1809).

Petrobius, Silvestri (1904).

Halomachilis, Verhoeff (1910).

When Leach established *Petrobius*, he was not able to distinguish it from *Machilis* by very definite characters; the only outstanding feature in his diagnoses, indeed, is the labial palp of which, in *Machilis*, the apex is said to be membranaceous, while *Petrobius* has "the last joint obliquely truncate, with the apex acute and not membranaceous." It is not surprising therefore that for many years his species *P. maritimus* was relegated to a comprehensive genus *Machilis* co-extensive indeed with the family Machilidae. In recent studies of the genera, Silvestri has now shown, however, that while *Machilis* (*sensu str.*) has

paired processes (gonapophyses or paramera) on both the eighth and ninth abdominal segments in the male, *Petrobius* has these structures on the ninth segment only, not on the eighth. Verhoeff has pointed out that in his *Halomachilis*—undoubtedly congeneric with *Petrobius*—the feelers have no scales except on the two basal segments, the apex of the mandible is untoothed (figs. 2, 3, II., III., *a*) and the tip of the labial palp (fig. 7, VII.) is beset with numerous flattened sensory spines (figs. 7, A, VII., A.). From the genus *Praemachilis*, Grassi, to which belong most, if not all, of the Irish inland insects of this family, *Petrobius* may be easily distinguished by the presence of two pairs of exsertile vesicles (figs. 5, V., *ve*) on each abdominal segment from the second to the fifth inclusive. In species of *Praemachilis* these segments have each only one pair of these vesicles.

***Petrobius brevistylis*, sp. nov.**

(PLATE 2).

Length (body and tail process) 21 mm. Feelers as long as body (11 mm.) general aspect and colouring as in *P. maritimus*: the whole body covered with dark scaling; feelers, cerci, and tail-process white-ringed. Paired ocelli dumb-bell shaped, less than a transverse diameter apart (fig. 1, *o*). *Median ocellus sub-ovate transverse* (fig. 1, *m o*.) *Mandible with blunt apex* (figs. 2, 3*a*). *Maxilla with lacinia shorter than galea* (fig. 6); palp having its six elongate segments with proportional lengths 6: 6: 8.5: 8.5: 6; *segments of palp relatively thicker than in P. maritimus* and the antepenultimate markedly swollen distally. *Eighth abdominal sternum with subcoxae produced into prominent rounded lobes* (fig. 8). *Ninth abdominal sternum* (fig. 9) *with sub-coxae produced into very small pointed processes; stylets relatively short and thick, with very short, blunt apical spines; gonapophyses with slightly sinuate outer edges reaching to the tips of the sub-coxae.* *Penis very clongate projecting beyond the stylets.* Ovipositor of female nearly as long as the cerci, which are less than half the length of the tail-process.

Locality, Portraine, Co. Dublin.

The characters emphasised by italics in the above diagnosis are of especial value in distinguishing this species from *P. maritimus*, Leach (Carpenter, 1913, pp. 3-5.) To facilitate discrimination between the two species, structural figures of some of the more important corresponding parts in *P. maritimus* are reproduced here (see Plate 2, figs. 1-9 for *P. brevistylis* and Plate 3, figs. I.-IX. for *P. maritimus*, with explanations). Comparison of these drawings will prove more effective than the collation of long descriptions. To facilitate comparison, similar parts in the two species are indicated by corresponding numbers, arabic in the case of *P. brevistylis* and roman for *P. maritimus*.

The contrast between the acute mandibular apex (fig. III., *a.*) of *P. maritimus* and the blunt truncated apex in *P. brevistylis* (fig. 3A.) is remarkably constant. The maxillary palps, and the stylets of the ninth abdominal segment relatively shorter and thicker in *P. brevistylis* than the corresponding structures in *P. maritimus* (compare figs. 6, VI., and 9, IX., *st*) are perhaps the best superficial features by means of which the two species may be distinguished, and are common to both sexes. The prominent rounded lobes of the sub-coxae of the eighth abdominal segment (fig. 8, *sc*) in the male of *P. brevistylis* are also a strongly distinctive feature. As these lobes are absent, in the true *P. maritimus*, Leach (fig. VIII.) they should not be used to distinguish *Petrobius* in a sub-generic sense, as has lately been done by Silvestri (1911).

Petrobius brevistylis, the new species now described, is distinct not only from the common British and Irish *P. maritimus* Leach, but from the Dutch insect which Oudemans designated *Machilis maritima* and described in his well-known memoir (1886). This last-named species, for which the name *P. Oudemansi* would be appropriate has, according to his figures, the lacinia of the maxilla much longer than the galea, the maxillary palp with the penultimate segment twice as long as the apical, the male gonapophyses not reaching the tips of the ninth abdominal sub-coxae, and the penis attaining only to half the length of the ninth abdominal stylets. *P. Oudemansi* agrees, how-

ever, with *P. brevistylis* in having prominent lobes on the sub-coxae of the eighth abdominal sternum. Whether the shore-haunting French species mentioned by Latreille (1832, p. 178) under the name of *Machilis maritima* is identical with any one of the three *Petrobii* discussed in this paper must remain, for the present, doubtful.

A few notes on the structure of the jaws in *Petrobius* may bring this paper to an end. It has been already mentioned that the absence of apical teeth on the *mandible* serves as a generic character. In a female specimen of the penultimate stage—apparently that distinguished by Verhoeff (1910, pp. 397-9) as “*maturus junior*,” the cuticle of the apex and molar region of the final instar can be clearly seen within the part now functional (fig. 3). The tip of this new mandibular apex has small but quite distinct teeth; apparently they are worn down almost as soon as the mandible comes into use. It is noteworthy also that there is apparently no new cuticle formed within the basal region of the mandible at this late stage, and the last moult undergone by the insect—at a stage when all its structures including the reproductive organs are developed—is incomplete. There is doubtless good reason for a fresh formation of the mandibular apex and molar surface which are subject to constant wearing action.

The *maxillulae* (fig. 4, *Ml.*, IV.) are exceptionally well developed in insects of this family; each maxillula shows a distinct lacinia and galea (fig. 4, IV., *l*, *g*), whose apices are finely spinose and reticulated, and a vestigial palp (fig. 4, IV., *p*.). The base of the maxillula is attached by a strip of membranous cuticle to the base of the median hypopharynx or tongue (fig. 4 *hy*), which has a granulated surface beset at the edge with minute bristles. The apex of the tongue is quadrate, emarginate centrally; its base is supported by a pair of strong chitinous feet (fig. 4, *pe*) which articulate with the tentorium of the head-capsule.

A somewhat complex “head” at the extremity of the lacinia of the *maxilla* (see fig. 6A) is characteristic of the Machilidae. This structure has been figured by Verhoeff (1904) from *Machilis polypoda* and by Börner (1908) from an undetermined Japanese Machilid. In *Petrobius brevistylis* the arrangement of parts does not differ markedly

from what is found in *Machilis*. The apex (fig. 6A, *a*) is stout and ribbed; it spreads out into lamellar edges embracing the central process (*b*), which bears numerous blunt spines forming a "brush"; internal to this are two acuminate processes (*c*, *d*) with minute irregular spines on their edges (Börner's Japanese species has four of these processes or "inner lamellae"). It is instructive to compare this lacinial head in an individual just after reaching full maturity (fig. 6A) with the corresponding structure in a specimen of the penultimate stage in which the apex, the brush, and the acuminate processes (fig. 6B, *a*, *b*, *c*, *d*) have been worn down almost to their bases. Here, again, however, as in the case of the mandible, the new cuticle for the final instar with these structures all sharp and ready for use, can be seen inside. Except for its somewhat greater relative length, the maxillary head of *P. maritimus* hardly differs from that of *P. brevistylis*.

REFERENCES.

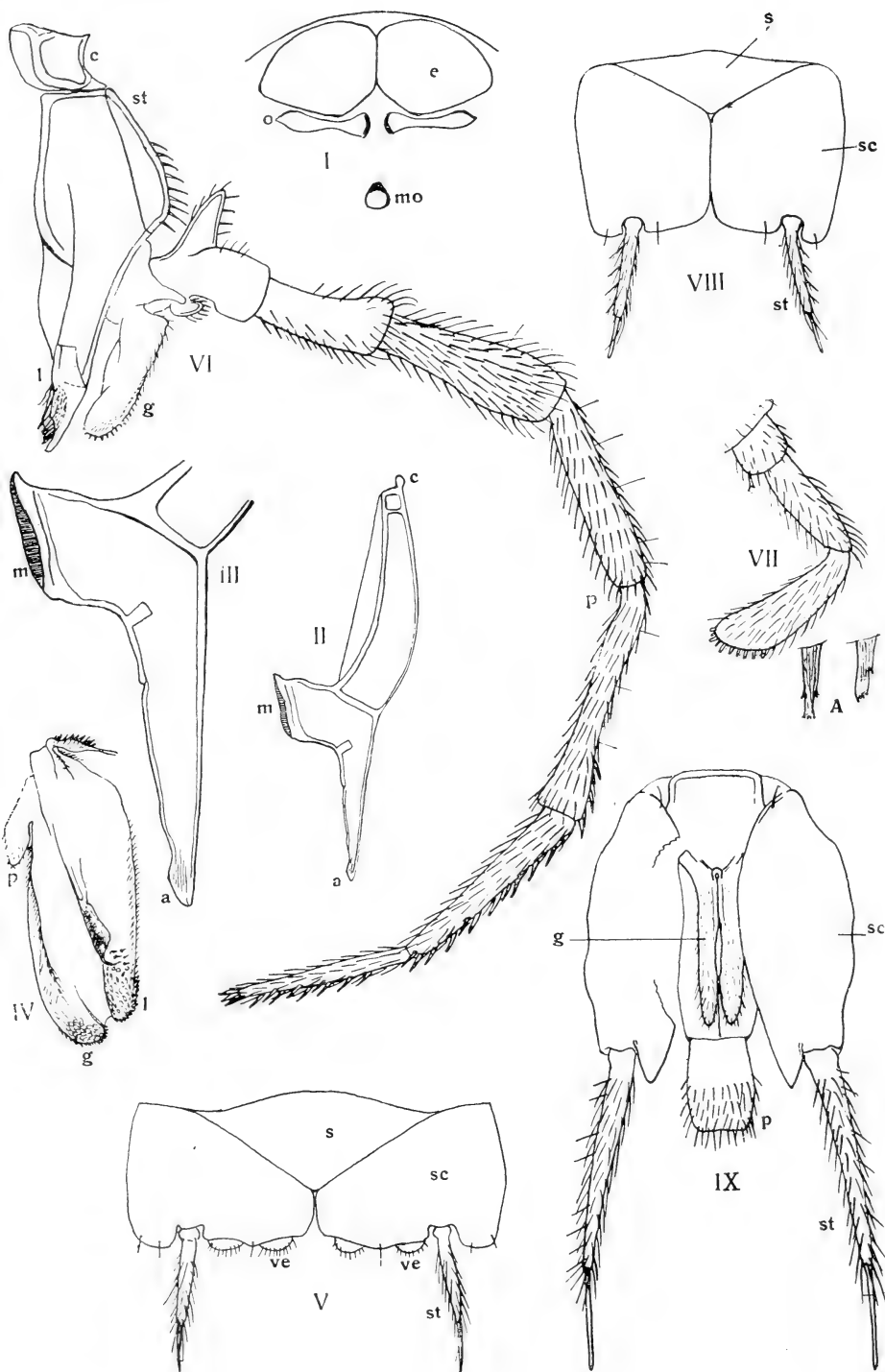
- 1908.—BÖRNER, C.—Collembolen aus Südafrika, nebst einer Studie über die I. Maxille der Collembolen. In Schultze's *Forschungsreise im westlichen und zentralen Südafrika*, Jena.
- 1913.—CARPENTER, G. H.—Clare Island Survey. Part 32. Apterygota. *Proc. R. Irish Acad.*, xxxi.
- 1832.—LATREILLE, P. A.—De l'Organisation extérieure et comparée de l'ordre des Thysanoures. *Nouv. Ann. der Muséum d'Histoire Naturelle*, i., pp. 163-187.
- 1809.—LEACH, W. E.—Article "Entomology" in Brewster's *Edinburgh Encyclopedia*, ix.
- 1873.—LUBBOCK, J.—Monograph of the Collembola and Thysanura. *Ray Society*.
- 1886.—OUDEMANS, J. T.—Beiträge zur Kenntniss der Thysanuren und Collembolen. *Bijdr. tot de Dierkunde* (Amsterdam).
- 1904.—SILVESTRI, F.—Nuovi Generi e Specie di Machilidae. *Redia*, ii.
- 1911.———— Contributo alla Conoscenza dei Machilidae dell' America Settentrionale. *Boll. Lab. Zool. Portici*, v.
- 1904.—VERHOEFF, K. W.—Ueber vergleichende Morphologie des Kopfes niederer Insekten. *Nova. Acta. Acad., L'op. Carol.*, lxxxiv., no. 1.
- 1910.———— Ueber Felsenspringer, Machiloidea, 4 Aufsatz: Systematik und Orthomorphose. *Zool. Anzeiger*, xxxvi.

EXPLANATION OF PLATE 2.

Structural details of *Petrobius brevistylis*.

- Fig. 1. Diagram showing shapes and positions of compound eyes (*e*) lateral ocelli (*o*), and median ocellus (*mo*). × 28.
2. Right mandible of female, hinder aspect. *c*, condyle; *a*, apex *m*, molar area. × 28.





PETROBIUS MARITIMUS Leach

3. Terminal region of right mandible of younger female (penultimate instar); *a*, apex; *m*, molar area. The new cuticle of this region can be seen within; note the feebly toothed apex. $\times 56$.
4. Hypopharynx (*hy*) front aspect, with the left maxillula (*ML*) slightly displaced laterally, but retaining its membranous connection with the base of the hypopharynx. *l*, lacinia; *g*, galea; *p*, palp of maxillula; *pe*, peduncle of hypopharynx. $\times 28$.
5. Fifth abdominal segment of male, ventral aspect. *s*, sternum; *sc*, sub-coxa; *st*, stylet; *ve*, exsertile vesicles. $\times 28$.
6. Right maxilla of female, hinder aspect. *c*, cardo; *st*, stipes; *l*, lacinia; *g*, galea; *p*, palp. $\times 28$.
- 6A. Head of lacinia showing apex (*a*), "brush" (*b*), and acute processes (*c* and *d*). $\times 90$.
- 6B. Head of lacinia from a specimen in the penultimate stage, showing apex (*a*), "brush" (*b*), and acute processes (*c* and *d*) greatly worn, and new cuticle of head formed within. $\times 90$.
7. Labial palp of female. $\times 28$.
A, sensory spines from its apex. $\times 180$.
8. Eighth abdominal segment of male, ventral aspect. *s*, sternum; *sc*, sub-coxa; *st*, stylet. $\times 28$.
9. Ninth abdominal segment of male, ventral aspect. *sc*, sub-coxa; *st*, stylet; *g*, gonapophysis; *p*, penis. The right sub-coxa is partly broken away to expose the gonapophyses. $\times 28$.

EXPLANATION OF PLATE 3.

Structural details of *Petrobius maritimus*.

- Fig. I. Diagram showing shapes and positions of compound eyes (*e*), lateral ocelli (*o*), and median ocellus (*mo*). $\times 28$.
- II. Right mandible of female, hinder aspect. *c*, condyle; *a*, apex; *m*, molar area. $\times 28$.
 - III. Terminal region of the same mandible. *a*, apex; *m*, molar area. $\times 56$.
 - IV. Left maxillula, hinder aspect. *l*, lacinia; *g*, galea; *p*, palp. $\times 56$.
 - V. Fifth abdominal segment of male, ventral aspect. *s*, sternum; *sc*, sub-coxa; *st*, stylet; *ve*, exsertile vesicles. $\times 28$.
 - VI. Left maxilla of female, front aspect. *c*, cardo; *st*, stipes; *l*, lacinia; *g*, galea; *p*, palp. $\times 28$.
 - VII. Labial palp of female. $\times 28$.
A, sensory spines from its apex. $\times 180$.
 - VIII. Eighth abdominal segment of male, ventral aspect. *s*, sternum; *sc*, sub-coxa; *st*, stylet. $\times 28$.
 - IX. Ninth abdominal segment of male, ventral aspect. *sc*, sub-coxa; *st*, stylet; *g*, gonapophysis; *p*, penis. The right sub-coxa is partly broken away to expose the gonapophyses. $\times 28$.

NOTES.

ZOOLOGY.

The food of *Silpha subrotundata*.

MM. Fairmaire and Laboulbène, in their "Faune Entomologique Française," Tome 1, state of *Silpha atrata*, L.:—"Il fait, comme l'espèce précédente, la chasse aux limaces." This observation I was never able to verify till the present autumn. In September, at Coolmore, I found a specimen of *S. subrotundata* sitting on a leaf of Black Knapweed (*Centaurea nigra*, L.) and hard at work devouring a snail. The beetle was holding the shell with its two front legs and thrusting its long narrow head into the opening to devour the snail within. I had often noticed the peculiar narrow shape of the head of *S. subrotundata* but I did not realise till I saw it at work the meaning of the shape of its head. *S. atrata* L. has the same shaped head and so has *S. lacvigata* Fab., the latter being the species referred to by MM. Fairmaire and Laboulbène in their remark quoted above as "l'espèce précédente." The same authors state of *S. dispar*, Herbst, that it is found "au bord des mares, ou il paraît dévorer les petits mollusques." It would thus appear that its food resembles that of *S. subrotundata*, and it would be very interesting to observe its mode of attacking its prey. The food of the other species of this genus is varied. Thus *S. rugosa*, L. is always found in carrion, but *S. opaca* L., in the larval stage at any rate is frequently found attacking Mangold, *vide* Professor Carpenter's reports of Injurious Insects for 1896 and 1907, *Economic Proceedings of Royal Dublin Society*, where most interesting accounts are given of the ravages of this insect.

Canon Fowler says that *S. quadripunctata*, L., is found on oaks and other trees, not in carcasses, and that it feeds on the larvae of various insects. The larvae of *S. thoracica*, L. are said to feed on decaying fungi; the perfect insect seems to have a partiality for fir plantations and feeds on carrion. The genus may therefore with safety be said to be on the whole one that is useful in destroying snails, larvae of insects and doing sanitary work by removing decaying animal and vegetable matter like Charles Kingsley's spider-crab in "Glaucus."

W. F. JOHNSON.

Poyntzpass.

Ravens on Brandon, County Kerry.

On Brandon, last June, on the cliffs below the summit, Ravens were abundant. On one occasion I counted twelve, and two days later no less than sixteen were seen together, playing in the air and performing fantastic evolutions.

Dublin.

R. LLOYD PRAEGER.

White Wagtails on Migration observed at Inishtrahull.

White Wagtails were numerous on Inishtrahull during the latter half of May, 1913. I am indebted to Mr. Wright, Principal Keeper, for sending me specimens; some adolescent, others fully adult. The birds continued to pass north until May 31st. On the 28th of that month I received an adolescent specimen which would not have bred this year. August 21st last was the earliest date on which I noticed the birds on this island affecting the return move. Seven appeared on that date, all immature. Two of these I collected. On August 25th, I procured an interesting specimen still retaining almost the entire nuptial plumage. On Friday, August 29th, many White Wagtails appeared round the lanterns, and 6 struck the glass; one collided, this night, with the kitchen window. Since I first saw this species on August 21st, it has been of very frequent occurrence up to when I write, viz., September 12th.

University, Sheffield.

C. J. PATTEN.

Nightjars at Sea.

During the cruises of the Department of Agriculture's steam cruiser *Helga*, I have observed Nightjars four times off the coasts of Ireland, and each time by daylight. The first was seen on 19th August, 1905, when we were fishing about half a mile off Howth. It was blowing a moderate gale from the west, about 30 to 35 miles an hour. The bird had evidently been blown off shore and alighted on the ship for shelter. When frightened it took wing again and was gradually blown out to sea. It flew as close as possible to the water, about a foot or two above it, as if trying to get shelter behind the crests of the waves. On the 17th May, 1910, when we were 84 miles west of the Bull Rock, a Nightjar was seen and, as well as I remember, came on board; at any rate, I have no doubt about the identification. On the 11th May, 1912, when we were 75 miles W.S.W. of the Fastnet, a bird flew round the ship, but was too frightened to alight. It hovered close to the water showing the white markings on the tail-feathers. I did not identify it at the time, but I noted its appearance, and recognised it later as the same species of bird which came on board in 1913. This occurred on the 5th May last, when we were 30 miles W.S.W. of the Fastnet.

Dublin.

G. P. FARRAN.

The Little Auk in August.

On August 30th a Little Auk was killed striking at the Aranmore light-station, Co. Donegal, being the first occasion on which this species has struck a lantern. On same date the Chief Inspector of Fisheries (Mr. W. S. Green) saw a Little Auk in the Kenmare River. It looked, he says, a "little out of sorts." Mr. Ussher has tabulated the monthly occurrences of the Little Auk ("Birds of Ireland," p. 368) and there are no records for June, July, August, or September.

RICHD. M. BARRINGTON

Fassaroe, Bray.

Dipper in County Longford.

In a letter in the *Morning Post*, last September, Rev. Sir George R. Fetherston records the occurrence of the Dipper at Ardagh, Co. Longford. Longford and Westmeath are the only two counties in Ireland from which, according to the "Birds of Ireland," Mr. Ussher had no record for this bird.

REVIEW.

ROCK-FORMING MINERALS.

Outlines of Mineralogy for Geological Students. By GRENVILLE A. J. COLE. 8vo., pp. 339 and 124 illustrations. London: Longmans, Green & Co., 1913. Price 5s. net.

Professor Cole's old students and geological students generally will be glad to read this latest product of his pen. The book is divided into two parts. Part I. deals with the characters of minerals, while in Part II. we have a descriptive account of those most commonly found. Chapter i. discusses the nature of a mineral, and the student is led by a simple method of elimination and illustration to the important characters of definite chemical composition and characteristic crystalline form. The physical characters of minerals and common features of crystals are dealt with in chapters ii. and iii., respectively, and lead on naturally to a consideration of the underlying elements of symmetry and the essential features of the seven crystallographic systems into which crystals are divided. In chapter iv. we have a description of the thirty-two classes of symmetry, the various forms in each being given in a clear and concise manner. Twinning and cleavage occupy chapter v., and in chapter vi. is a very good exposition of that most thorny of all problems for the ordinary student—the optical characters. In chapter vii. further physical features such as fluorescence and radioactivity are treated of, and in chapter viii. the student is introduced to simple methods of blow-pipe analysis of minerals. In the descriptive part of the book the minerals are arranged by the fundamental element in each, and these are taken in the order of Mendelief's table. Thus iron, nickel, cobalt and platinum are considered in the tenth chapter, and under the head "Iron" we have Native Iron, Pyrite, Marcaoite, Pyrrhotite, Haematite, &c. The book is excellently written throughout, and it should prove of even greater value to the student of geology than the "Aids in Practical Geology" which is everywhere highly spoken of.

I. SWAIN.

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AND

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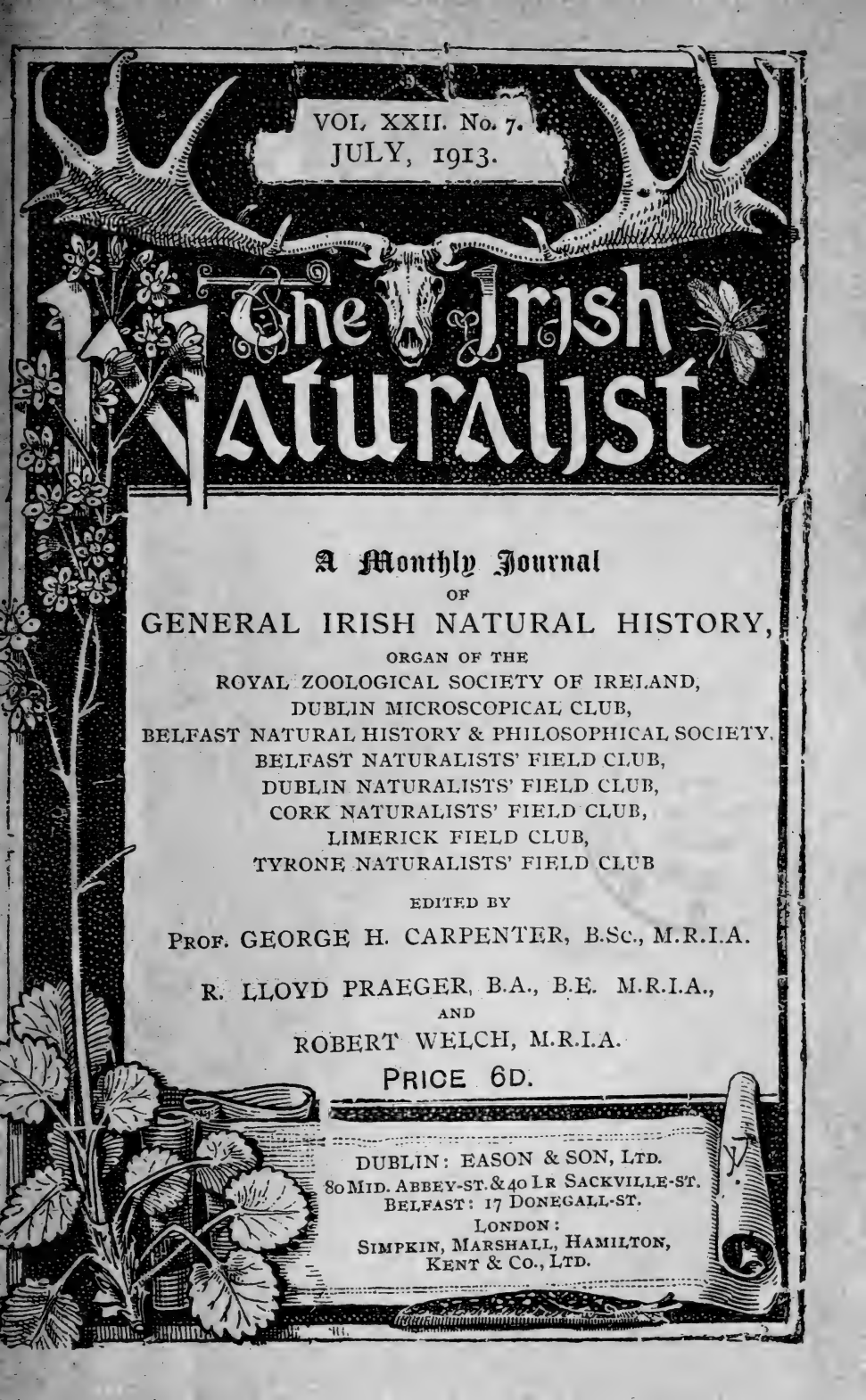
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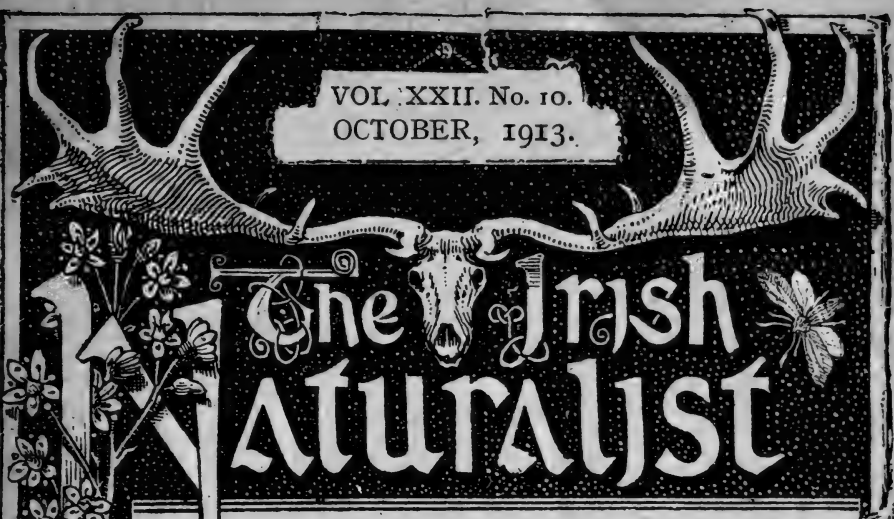
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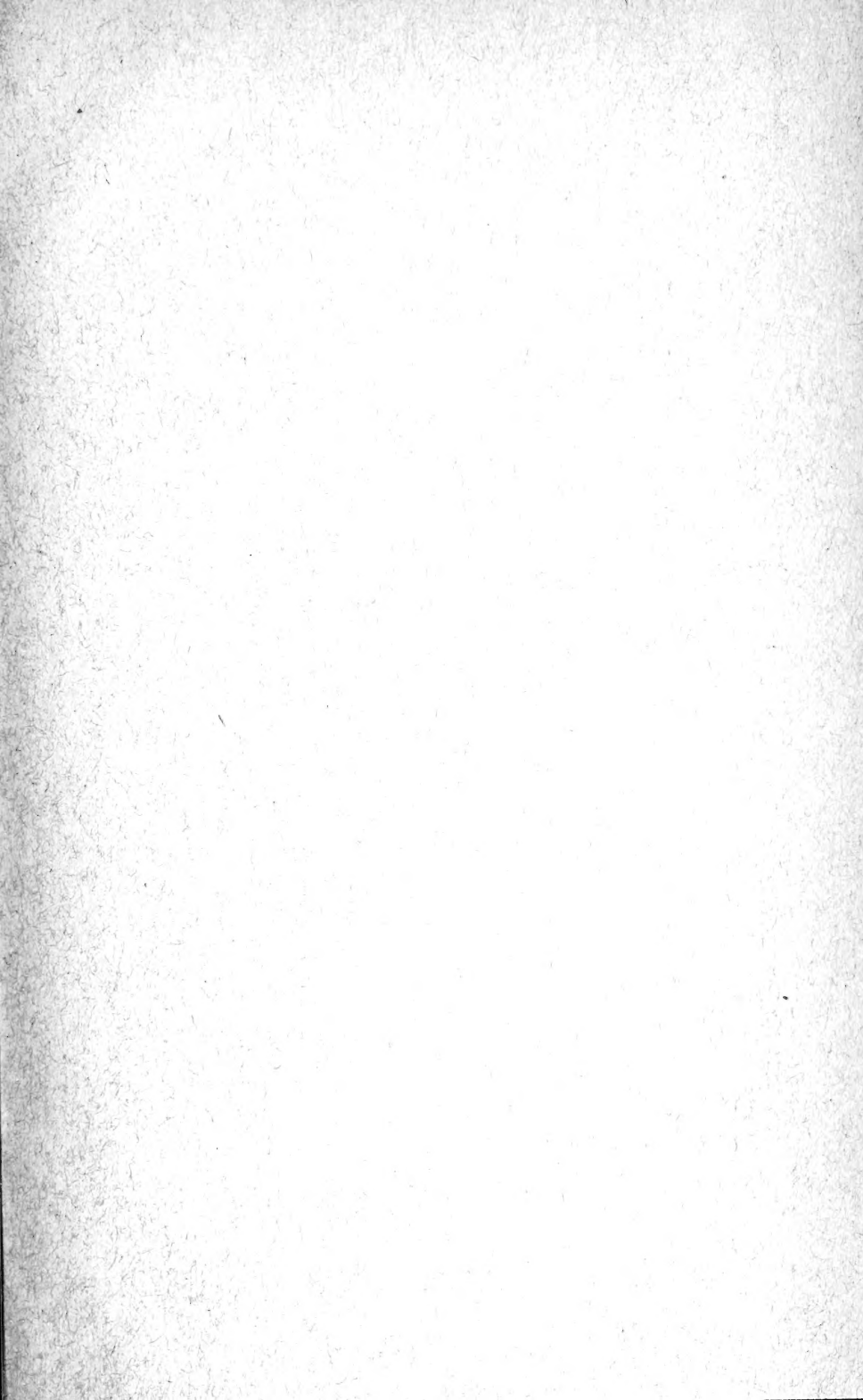
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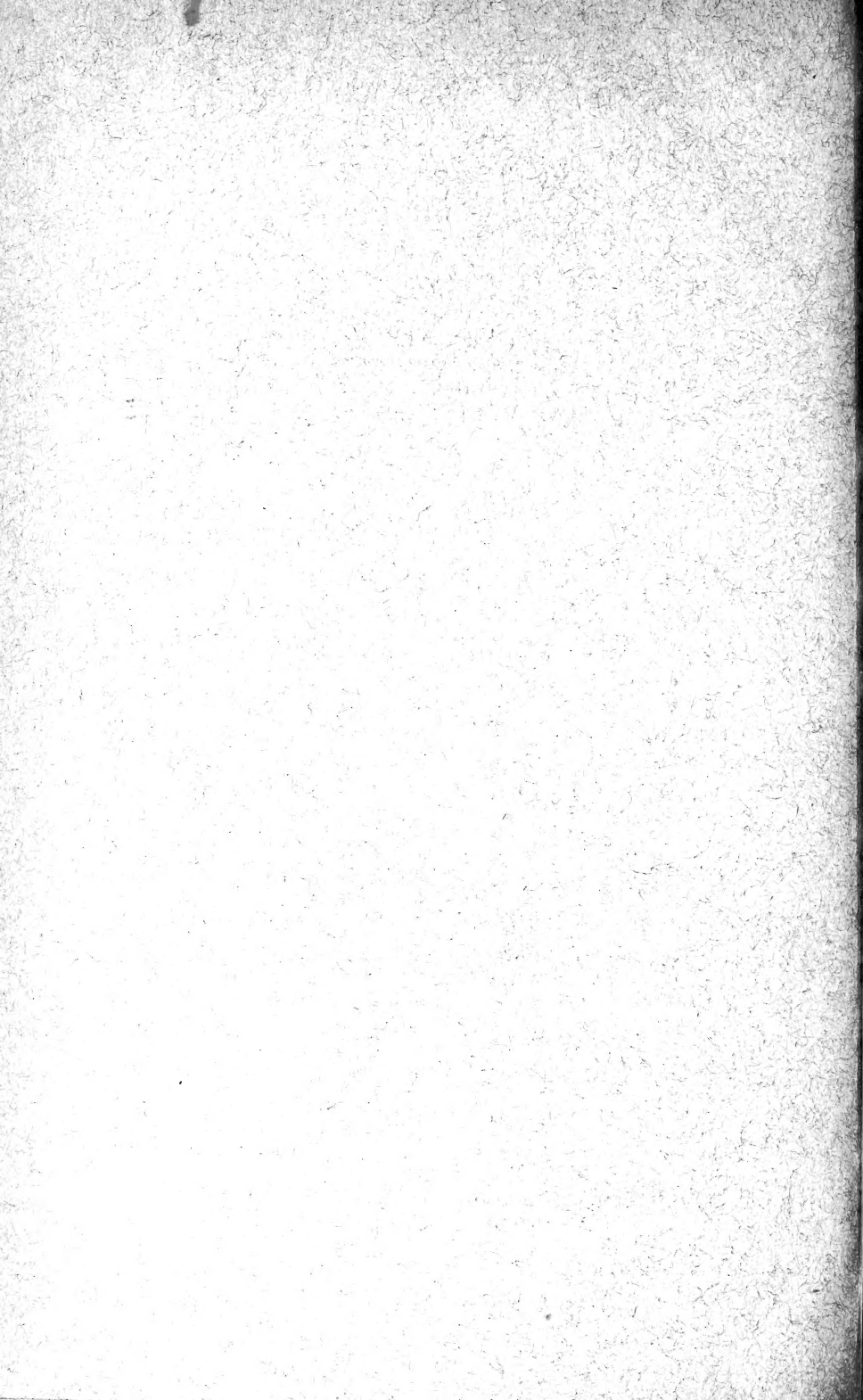
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